THE MODERN TREATMENT OF SYPHILIS.

I.

THE TREATMENT OF SYPHILIS IN ITS EARLIER STAGES.

BY

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AN experience in the treatment of syphilis which extends over a considerable number of years, and has been gained under particularly favourable conditions for estimating the value of antisyphilitic remedies, has led us to certain conclusions which we think of some interest.

The great advances which have been made in the diagnosis and treatment of syphilis in recent years enable us now to diagnose this disease from its earliest stages, detect its presence in the absence of naked-eye signs, and effectually control its progress. The old uncertainty of diagnosis in the primary stage has been replaced by the certainty which results from microscopical examination of the exudate from the sore; the signs of syphilis have been increased by one which is the most constant of all—the Wassermann reaction; and, thanks to salvarsan, the slow dragging progress towards recovery which was the rule under exclusively mercurial therapy, a progress which was often marked by many relapses, has given way to one which is at once more rapid and, judged by every test we can apply, more permanent.

It requires no very vivid imagination to realize what these advances mean to the control of syphilis. For ourselves, we believe that, properly used, they give us the power to limit syphilis to its earliest stages, and eventually to abolish, amongst other curses, congenital syphilis. As a contribution to this ideal we will describe the lines on which we think syphilis should now be managed in its earlier stages.

THE IMPORTANCE OF EARLY DIAGNOSIS AND TREATMENT.

The results we have obtained with salvarsan have shown us that it is of the very greatest importance to commence treatment in the earliest possible stage—much earlier, in fact, than that in which the primary sore can be recognized by the naked eye. In each of the various series of cases we have treated with salvarsan on different definite plans the total relapses which followed when treatment commenced in the secondary stage were more than double those which followed when it commenced in the primary stage. Add to this the risk of transmission to others, either directly from the sore or through the seminal fluid, and the chances of the central nervous system becoming seriously infected during the weeks which elapse between the first appearance of the primary sore and the outbreak of secondary signs, and it must be clear that every effort should be made to ensure that treatment commences as early as possible.

The value of a microscopic examination to the diagnosis of early syphilis does not seem to be sufficiently recognized. When a patient presents himself to his medical adviser with an early syphilitic sore, the commonest mistake which is made is to judge it by its naked-eye appearance, assume at once that it is not syphilitic because it has not the look of a Hunterian chancre, and prescribe an antiseptic ointment. Subsequently, when the sore begins to look more typical of syphilis, a blood test is thought of, a specimen of blood is sent to a pathologist, and the result not infrequently returned as doubtful or negative. Still a diagnosis is not made and more time is lost, till, finally, a positive blood reaction, or the outbreak of secondary symptoms, makes the diagnosis clear. All this time the spirochaetes have been multiplying in the patient's tissues, and the latter have been surrounding it with barriers of new connective tissue, which make it increasingly difficult for remedies eventually to reach the parasite. If in the first instance the surgeon had caused a little serum to ooze from the *margin* of the sore by scraping it lightly with a scarifier, by rubbing it over with spirit and drying off the spirit, or by rubbing it fairly energetically with a dry swab, had allowed the serum to run into a capillary tube (such as is used for calf lymph), a procedure which is fully as easy as the taking of a blood specimen, and had then dispatched the specimen to a pathologist, a diagnosis in the case of syphilis would have been reached in practically every case within a few minutes of the opening of the parcel. Another mistake which is commonly made is to apply an antiseptic ointment to the sore when it is first seen, and some time later, when the sore takes on a suspiciously syphilitic appearance, to take the specimen for microscopical examination. If by any chance an antiseptic has been applied to the sore, and the specimen has to be posted, less time will be lost in the end if it is dressed for a few days with simple saline solution or boiled water, since the application of an antiseptic to the sore always causes the spirochaetes to retire to the deeper layers.

For over four years we have made a rule of microscopically examining the exudate from every sore, however trivial and unlike syphilis it may appear, and are convinced that is impossible for anyone, however experienced he may be, to recognize a syphilitic sore in its earliest stage without the aid of the microscope. This is the stage, however, in which, as we have said, it is of prime importance to commence treatment, and it follows that the surgeon who would do the best for his patient will never neglect this method of making an early diagnosis.

By repeatedly demonstrating the certainty with which a diagnosis of syphilis can be made by means of dark-ground illumination, by enlarging on the trivial appearance of many sores in which we have demonstrated the *Spirochaeta pallida*, and by frequently speaking in the presence of our patients of the advantages of early treatment, we have gradually educated the soldiers under our charge to take serious notice of the merest abrasions of the penis. Certainly the microscope often reveals no spirochaetes, and later events show that the sore was non-syphilitic; but, on the other hand, it is becoming more and more common for soldiers in the London District who are infected with syphilis to "report sick" when the sore is no larger than a split pea. It is worth the trouble of many negative examinations of non-syphilitic venereal sores to have the satisfaction of detecting one case in such an early stage, and commencing treatment at once. Circumstances make it, of course, easier to educate the soldier in these matters than the civilian, but we cannot help thinking that if all practitioners realized the value of an early diagnosis of syphilis and the ease with which it can be carried out, their knowledge would gradually be conveyed to the public.

In connexion with the examination of venereal sores another point may be mentioned here. Occasionally it happens that a patient is doubly infected by one exposure. A few days after exposure a soft chancre develops in which the *Spirochaeta pallida* is not discovered, but the patient subsequently develops secondary syphilis. The early stages of such syphilitic infections may easily be missed if a close watch is not kept on the sore, especially at the end of two to four weeks after it has made its first appearance.

It is not necessary to enlarge on the Wassermann test as a means of diagnosis. Of its value there can be no doubt, but the ideal treatment of syphilis commences before the Wassermann reaction is of any value in diagnosis, and the place of this test is properly in the subsequent observation of the patient.

TREATMENT.

The diagnosis having been made on the lines suggested above, it becomes necessary to lay down a programme of treatment and to see that it is carried out.

In the following remarks we shall speak of salvarsan rather than of neo-salvarsan, because we have chiefly worked with the older preparation. A short experience with neo-salvarsan inclined us to the belief that it is not quite so active as salvarsan in corresponding doses, but our chief reason for adhering to salvarsan is that neo-salvarsan is more easily oxidized than salvarsan, especially at high

temperatures, so that we did not think that it would be suitable for use in the tropics, and preferred to find out what could be done with a preparation which could be used wherever our soldiers serve.

It is hardly necessary now to produce further proof of the superiority of salvarsan and mercurial treatment over exclusively mercurial treatment. This is agreed upon by practically every one who has had an opportunity of comparing fairly the two methods, and we need only mention here the figures we produced at the International Congress of Medicine this year. These showed that of 378 patients treated exclusively with mercury in regular courses 83 per cent. relapsed clinically at least once during the first year, while out of 152 patients treated with two injections of salvarsan and nine injections of mercurial cream, or three of salvarsan and four of mercurial cream, only 3.9 per cent. relapsed clinically within *a year of the suspension of treatment*. Three months after the suspension of two years' regular mercurial treatment, out of 289 cases, more than 40 per cent. gave a positive reaction to the original Wassermann test, while twelve months after the suspension of a course of treatment with salvarsan and mercury, which lasted not more than nine weeks, 19.4 per cent. gave a positive reaction.

It is of the utmost importance that the patient be impressed with the necessity of undergoing a thorough initial course of salvarsan and mercury, and of subsequently submitting himself to periodical examinations. If the patient will not undertake to submit to a thorough and definite course of salvarsan and mercurial treatment, it would probably be wiser to withhold the salvarsan, since in this case the patient would generally be compelled by a succession of reminders to prolong his treatment over what is really a critical period.

In the early stages of salvarsan treatment a large number of cases in the early primary or secondary stage received a single injection of salvarsan, which caused the rapid disappearance of all clinical symptoms. Impressed by this and believing themselves to be cured, they refused further treatment, if such was advised. A very large proportion of these cases subsequently relapsed; in other words, became infectious again, and doubtless many of them transmitted the disease to others. Further, it is amongst these patients who received what we now know to have been a quite inadequate amount of treatment that practically all the cases of cranial nerve disturbance have occurred. It has been established by the researches of Dreyfus and others that the meninges are infected during the early stages of syphilis in a far larger proportion of cases than was ever imagined (83 per cent. according to Dreyfus), and it is clear that the first course of treatment must be calculated to prevent infection of the central nervous system. We cannot discuss here the question of cranial nervous disturbances being due to salvarsan poisoning as some have asserted. It is sufficient to say they occur for the most part amongst patients who have received considerably less salvarsan than is usual, and that when promptly recognized and treated with salvarsan before the nerve has become irrevocably damaged they almost invariably recover. The only two cases of the kind which we have had support these remarks, since both of them received much less salvarsan than we are in the habit of administering.

It may be said here that it is easy to prescribe a thorough course, but it is another matter to get a free and independent patient to carry it out. We grant that it is a much more difficult question with civilian patients than with military, but if the medical adviser thoroughly believes in the truth of his advice he can do a great deal towards making his patient carry it out.

Another question of interest is the safety to life of salvarsan injections. We consider that when due regard is paid to the precautions which we will shortly mention it is fully as justifiable to recommend a salvarsan injection as a mercurial. No death or symptom causing any alarm has followed any of the 3,800 injections which have been given at the Military Hospital, Rochester Row. Out of some thousand injections which have been given at the Portobello Military Hospital, Dublin, there has been one death, and out of nearly 6,000 injections given by American army surgeons, one death can be attributed to salvarsan. In each of these cases the death followed the second of two injections given within fourteen days of one another. For ourselves, we think that the administration of salvarsan is safe enough to justify its recommendation in all ordinary cases of syphilis.

Precautions in Special Cases.

There are cases in which it is advisable to proceed cautiously, and amongst these we would include all suffering from disease of the central nervous system, of the heart, lungs, or other viscera. In these it may be necessary to commence with 0.2 to 0.3 gram salvarsan, and so to administer the total amount of salvarsan considered necessary by means of a number of small injections rather than in a few larger ones. We make a practice of examining the urine of every patient before injecting salvarsan, and when albumin is found administer a first dose of 0.2 to 0.3 gram, according to the condition found, and repeat the dose or slightly increase it a week later if the first injection produced no untoward symptoms. Neisser recommends that in all cases a cautious start should be made so as to make sure that one is not dealing with an idiosyncrasy to salvarsan. This can, of course, always be done provided that in the end the patient receives in a reasonable time the total amount which is considered adequate, but in ordinary cases of syphilis, where the patient appears to be otherwise healthy, we prefer to give the total amount of salvarsan which we consider necessary for one course in a few full doses rather than subject the patient more frequently to the inconvenience of preparation for and the after-treatment which an intravenous injection of salvarsan entails.

Considerations Concerning the Intervals between Doses.

Another question connected with the safety of salvarsan concerns the intervals of time at which full doses can be injected. It has been the practice of some surgeons to give full doses at intervals as short as forty-eight hours, but more and more are now advocating longer intervals than this. Quite possibly in the great majority of cases it may be safe enough to give two injections of 0.6 gram within two days of one another, but, as far as we can judge from the literature, in practically every one of the cases in which epileptiform convulsions followed by coma and death on the fourth or fifth day after an injection has occurred, it was after two or more full doses had been administered at an interval which was something less than fourteen days. The number of cases in which these symptoms, which we think must be attributed to salvarsan poisoning, have followed the first injection must be very small, since we had been able to find records of only three. It seems to us, therefore, that we have to reckon with a very occasional idiosyncrasy to salvarsan, and that this is manifested practically only when the remedy exercises a cumulative action. There is no point in running even the very slight risk of such a calamity as we have described if it can be avoided by sufficiently spacing out the injections, and, for reasons given below, we think that the periods between full doses of salvarsan can be lengthened to more than fourteen days without lessening the therapeutic effect if mercurial injections are given in the intervals.

Preparation and After-Treatment.

The preparation and after-treatment of patients are of some importance to the safety of salvarsan. We recommend the administration of a purgative on the night before, and allow no food for four hours previous to an injection. The patient is made to rest in bed till the following day, being allowed solid food for the first time three to four hours after the injection, provided there is no vomiting or diarrhoea. Though he gets up on the following day, the patient is not allowed to do anything more than lounge about. Possibly this is an excess of caution, but a certain proportion of patients have a slight rise of temperature on the second evening, and it is from those who have dined out, gone to the theatre, or otherwise dissipated on the second day that we have had the most complaints of slight malaise and headache for a few days after the injection.

Our principle in regulating the intervals between doses is based on the following conception:

That the first full dose probably destroys every *Spirochaeta pallida* which it can easily reach through th

circulation, but that in the midst of infiltrated areas a certain number of spirochaetes escape complete destruction since the remedy does not reach them properly.

That after the first injection the surviving spirochaetes remain inactive; nature begins to remove the infiltrations which resulted from the previous activity of the parasite, and in doing so sets free the spirochaetes buried there. This process of repair, as is well known, takes a few weeks (witness the length of time the induration remains round a well-developed primary sore), and until it is fairly well advanced it seems to us that another dose of salvarsan is practically wasted.

That it is necessary to ensure that as these sclerosed areas are opened up and the spirochaetes within them are freed the latter are allowed no headway. This we think can be done by keeping a containing force in the form of a small amount of mercury continually circulating in the blood.

Our conception may be quite wrong, but is supported by this, that in a large proportion of relapses the symptoms which characterize the relapse are an exact reproduction of those for which the patient first sought treatment. This is especially marked in primary cases, in which the relapse is very frequently manifested by a return of the primary sore without other symptoms.

Plan of Course.

Regarding the course which can be considered the minimum, it is as yet impossible to speak quite definitely, since we have not been able to devise one course which is at once the most economical and followed by no relapses. We have administered salvarsan or salvarsan and mercury on certain definite plans to successive series of cases, and have subsequently followed the progress of as many of our patients as possible in order to determine which plan of treatment is followed by the smallest proportion of relapses. The results of our investigation on these lines have been published from time to time and were read to the International Congress of Medicine this year. They dealt with the following schemes:

1. A single intramuscular injection of salvarsan.
2. Two intravenous injections of 0.6 gram salvarsan at an interval of a fortnight.
3. An intravenous injection of 0.6 gram salvarsan, followed at intervals of fourteen days by three intravenous injections of 0.3 gram salvarsan.
4. Three intravenous injections of 0.6 gram salvarsan at intervals of fourteen days, with four weekly injections of calomel, all within the same month.
5. An intravenous injection of 0.3 gram salvarsan, followed by nine mercurial injections, and lastly, an intravenous injection of 0.3 gram salvarsan.
6. An intravenous injection of 0.6 gram salvarsan, nine weekly injections of mercurial cream, and lastly, an intravenous injection of 0.6 gram salvarsan.
7. An intravenous injection of 0.6 gram salvarsan, five weekly injections of mercurial cream, a second intravenous injection of 0.6 gram salvarsan, five more mercurial injections, and lastly, an intravenous injection of 0.6 gram salvarsan.

Disregarding (5), which proved an utter failure, the use of mercury in conjunction with full doses of salvarsan gave better results than the exclusive use of salvarsan. The last course mentioned (three salvarsan and ten mercurial injections) promises to give the best results of all, though we have not yet treated a sufficient number of cases to judge its merits fairly. This course is more intensive than one consisting of two salvarsan and nine mercurial injections, which our tables showed to have given the best results up to date. It can, therefore, be expected to be followed by fewer relapses, and as it is necessary to improve on the course of two salvarsan and nine mercurial injections, which was followed by 5 per cent. clinical and 18 per cent. Wassermann relapses within twelve months of suspending treatment, we can only consider that for the present the minimum course should consist of three salvarsan and ten mercurial injections distributed in the manner we have described.

In cases in which it is necessary to make a cautious start by giving 0.2 to 0.3 gram salvarsan, provided that the patient has shown no untoward symptoms after the first dose, we inject the balance to make up 0.6 gram within five to seven days of the first injection. When the central nervous system is obviously involved, although it is necessary to commence cautiously, the total amount of salvarsan administered in one course should be greater (even double the amount) than that which is given in ordinary cases, and the cerebro-spinal fluid should be examined at the end of the course.

In primary cases it is important to treat the sore, either by excision, cautery, or with calomel ointment. This is the order of preference, and the choice must depend on the site of the sore.

All Cases to be Kept under Observation.

Subsequent observation of the patient is indispensable. As a routine measure in dealing with soldiers we excuse attendance for three months after the first course, as we have found that relapses do not occur during this period. At the end of three months a clinical examination is made and the blood tested for the Wassermann reaction by the original and by Stern's method. Subsequently, in secondary cases a clinical examination is made every month, and the blood is tested every three months till the end of the first year. In primary cases a clinical examination is made every month for three months, and then every three months till completion of the period of observation, the blood being examined every three months as in secondary cases.

Our practice during the second year varies with the nature of the case when first treated. Primary cases are excused further attendance when the blood has continuously given a negative reaction, and there have been no clinical signs for twelve months after *suspension of treatment*. Secondary cases are observed at regular intervals throughout the second year. A patient is considered to have relapsed, and to require further treatment, if at any time he either shows clinical signs of syphilis or his blood serum gives a positive Wassermann reaction.

In case of relapse, there is a temptation, especially if the only manifestation is a weakly positive Wassermann reaction, to prescribe only a single dose of salvarsan, in the hope that this, added to the previous treatment, will complete the defeat of the spirochaete. We think this a mistake, and that, on the slightest sign that the disease is not eradicated, the patient should receive a course which is as strenuous as, or more strenuous than, that at first prescribed.

Standard of Cure.

There is nothing more difficult than the laying down of a standard of cure for syphilis. It is well known that absence of clinical signs for many years is of little value, and the Wassermann test is of too recent date to enable us to judge what reliance we can place on a series of negative reactions.

As a routine measure we have adopted the standard mentioned in speaking of the observation of patients—that is, in primary cases twelve months, and in secondary cases two years, freedom from signs, clinical or Wassermann, from the date of the last injection.

In a number of special cases, such as when the patient wished to marry at an early date, we have given the provocative injection of a small dose of salvarsan, followed by three blood tests at intervals of two, six, and thirteen days, which has been advocated by Gennerich and by Milian, but in only one did the previously negative serum become positive, and we have not adopted it as a routine test for cure.

SUMMARY.

We have endeavoured in the above remarks to convey our views as to the lines on which we think early cases of syphilis should be managed. Summed up, they amount to this:

1. Commence treatment in the early primary stage whenever possible.
2. Destroy the primary sore whenever possible and insist on the patient receiving not less than three salvarsan and ten mercurial injections in the manner described.
3. On no account neglect subsequent observation, and prescribe a definite course which is just as strenuous as in the first instance if the patient shows the least sign, clinical or Wassermann, that his disease has not been eradicated.
4. Be cautious about pronouncing a patient cured in any case, but certainly do not do so till he has continued free from all signs, clinical or Wassermann, for at least a year

after suspension of treatment in primary cases, and two years in secondary cases.

The price of salvarsan and the amount of special work which such a scheme entails make it inapplicable under present conditions to patients in poor circumstances, but it is hardly necessary to say that the control of syphilis in its earlier stages affects the lives and happiness of a sufficiently large percentage of the population, present and future, to make it of national importance.

When we had to rely on mercury, it was practically hopeless to attempt such a control, but with salvarsan, which renders the patient non-infectious so quickly, and has so markedly shortened the duration of treatment, our course, though still difficult, has become clearer, and it is not too much to hope now that we shall be assisted with adequate measures in removing a great curse from our midst.

II.

THE TREATMENT OF SYPHILIS AT THE ROYAL NAVAL HOSPITAL, CHATHAM:

Results during the Last Two and a Half Years, and the Inferences to be Drawn from them.

By Surgeon GILBERT BODLEY SCOTT, R.N.

To those members of the medical profession who have not had much experience in the modern treatment of syphilis, and who are considering it from the practitioner's point of view, the following observations may be of value.

During the period in which I was in charge of this work 1,100 cases were treated by salvarsan and neo-salvarsan and 2,500 injections were given. For its proper control Wassermann reactions are necessary, and in the period mentioned over 3,000 reactions were carried out.

There are between 108 and 130 beds at Chatham Hospital set apart for venereal disease only. The cases come from ships, chiefly in the North Sea, and the disease is contracted at the various ports on the East Coast of Scotland and England. In addition every few months batches of invalids arrive from ships abroad.

Variations in Virulence.

Three points in the incidence of the disease are worth mention. Some towns produce a much more virulent infection of syphilis than others do, and I always consider that the Bombay and Gibraltar infections are not only much more severe than English and Scottish, but are not so amenable to mercury. Syphilis contracted in China will produce in Europeans a very rapid and virulent form of the disease.

This geographical factor should undoubtedly influence the initial intensity of the treatment, its duration, and the prognosis. By prognosis I do not mean danger to life, but likelihood of relapse to active disease and a permanent positive Wassermann reaction.

Extragenital Infection.

The treatment of extragenital chancres is influenced in the same manner. I have found that the fingers and lips are the most frequent sites.

Naval medical officers thoroughly realize the danger of lip infection on board ship, and men liable to pass on the infection are segregated in the sick-bay or sent to hospital.

Were this precaution not taken lip chancres would be far more frequent. It is just as necessary to instruct syphilitic patients in the prevention of the spread of disease as it is the tuberculous. The old stone fountain and chained drinking cup must have caused in hot weather many cases of syphilis and other communicable diseases. The prevention of finger chancres lies not with the removal of offending nails, splinters of wood, and other excuses, but in improving the morals of man.

Diagnosis.

The early diagnosis of syphilis is of vast importance, and the bearing on the treatment, the prognosis, and the patient's life is not yet properly realized by three-quarters of the medical profession and not at all by the public.

If there is to be no return to the Contagious Diseases Act of 1864, then the abolition of the hidden plague in relation to syphilis must still lie in the treatment of men and women immediately they become sources of danger. Early diagnosis and treatment must go hand in hand, and to carry out this ideal successfully some kind of institution analogous to the tuberculin dispensary must be formed.

Importance of Early Diagnosis.

I will take the subject of early diagnosis first and summarize beforehand what I am going to say.

1. For our purpose the diagnosis by the Wassermann reaction is practically useless.
2. The only useful means of diagnosis of early syphilis is the demonstration of the *Spirochaeta pallida*.

I am firmly convinced that if all cases of syphilis were examined in the first stage of the disease, and in the first few days of that stage, before antiseptics have been applied, the spirochaete could and would be easily found.

I am also firmly convinced, although I cannot give definite proof, that if these early cases are treated by two or three injections of salvarsan or neo-salvarsan and a short course of mercury, 99 per cent. of these will be cured.

When once the Wassermann reaction has become positive or the sore hard and indurated this treatment will not cure more than 60 per cent., and I should remain doubtful of that 60 for the next fifteen years.

If, however, a prolonged course of mercury—two to three years, with intermissions—is given to these cases in conjunction with salvarsan, a better outlook is obtained.

Not many years ago we allowed our patients to reach the secondary stage before we made a diagnosis and treated them. What would be said if we to-day waited to see if secondary deposits of cancer occurred in the liver in a suspected case of epithelioma of the lip, or a tumour in the region of the appendix to burst before diagnosing an abscess?

It sounds ludicrous, but it is really not more absurd than at the present day to wait for a positive Wassermann reaction or secondary symptoms. I am of the opinion that when once a man has developed secondary syphilis at least 60 per cent. of his chances of being cured have gone. When the disease has been established for a year I do not believe there are more than 20 per cent. in whom a cure is effected or in whom the infection dies out. I except from this statement McDonagh's method of treatment, because I have had no practical experience of its results and am not qualified to give an opinion. Why should we condemn our patients to such a poor outlook when early diagnosis and treatment give such a good one?

Demonstration of the Spirochaete.

The diagnosis of early syphilis by demonstration of the spirochaete is easier than examining for tubercle bacilli in the sputum.

The methods are two: (1) By Chinese ink; (2) by the dark-ground illumination. Both these methods are described in any book dealing with laboratory work, but a laboratory is not required, only the most simple apparatus, a microscope, and experience in recognizing the various forms of spirochaete.

If we do not get our patients in this early stage these methods are still easily employed, provided that no antiseptic has been applied to the sore, and that it is not a healing one.

Under these two latter conditions a diagnosis must be made from its character or by Wassermann's reaction. A hard indurated sore, if not malignant, is almost certainly syphilitic. A soft shallow one more often turns out to be syphilis than "chancroid." Therefore, the nature of a soft sore cannot be diagnosed by its appearance.

Date of Wassermann's Reaction.

Wassermann's reaction becomes positive about three to four weeks after the appearance of the sore in most cases. Sometimes it is earlier, sometimes later. I refer here to reactions done by Fleming's method, or the original when using cholesterin antigen.

The appearance of the reaction probably means that the infection has passed beyond the local stage, that it is

general and producing certain tissue changes. If this be so, it is obvious that our aim must be to treat the patient effectively before the reaction is positive, and not only my results but those of all of us who have had experience in salvarsan treatment and Wassermann work bear this out.

Should there be any doubt about the nature of an early case I think that we should err on the side of a positive rather than a negative diagnosis. Treatment is simple and quickly carried out, and the gain is well worth the risk. On the other hand, if we wait for other diagnostic signs the outlook for cure is greatly clouded.

If medical men are to be able to carry out this early diagnosis and treatment it is evident that all those likely to run the risk of being infected must also fully realize its value. To obtain this ideal this important point must be brought home again and again to men or women in any suitable form of organized lecture dealing with venereal disease.

Treatment.

The treatment of syphilis has passed through great changes during the last few years, discussions have been innumerable, and opinions on the relative value of the methods most diverse.

In the Early Stage.

There is one great fact, however, of primary importance on which we are unanimous, and that is the value of early treatment. By this I mean treatment before the Wassermann reaction has become positive.

My own results have produced 100 per cent. of negative reactions lasting from one to two years after treatment had been stopped. To these cases I had given two or three injections of 0.6 gram of salvarsan, or 0.6 and 0.75 gram of neo-salvarsan, combined with three months' treatment by mercury inunctions, injections, by the mouth, or combined. The mercury is pushed until salivation occurs; this I consider most important.

In giving intramuscular injections of mercury equivalent to a grain of the metal or a grain of calomel this effect is usually not obtained, nor is it by the mouth unless large doses are used. Therefore for the first week or so with either of the above forms of treatment I order inunctions of mercury with a lanoline basis, and continue the combination until salivation occurs.

It will often be found that the tonic effect of salvarsan permits a much larger amount of mercury to be given than could otherwise be done. Most cases, I am convinced, do not get sufficient mercury at the outset. Generally mercurial injections are not enough.

This intensive treatment needs care and discrimination. It would not do to mercurialize a patient with pyorrhoea alveolaris, with non-syphilitic albuminuria, or one who is very anaemic.

If there is an idiosyncrasy to mercury, it will be shown in the first few days and harm prevented. One has not the same control if an equivalent amount of the metal were given intramuscularly, and it is on this account that I prefer the combination.

In Secondary and Late Syphilis.

We are all agreed upon the necessity of early treatment and of combining mercury with salvarsan in all stages of the disease. There is, however, a great diversity of opinion in the method of treatment which we should adopt in secondary and late syphilis. Were salvarsan or neo-salvarsan injections free from risk we could give them *ad libitum* and settle once and for all the question of its producing permanent cures in these stages of the disease. Repeated injections of either drug are, however, accompanied by a most definite risk, and, moreover, one which we are in many cases absolutely unable to guard against, a large number of fatal results having occurred in men who, apart from their disease, seemed perfectly strong and healthy.

Causes of Accidents in Treatment.

I have had one of these extremely distressing results, and a second man died under very suspicious circumstances. Two other cases caused great anxiety for twenty-four hours and were saved by a procedure which I shall mention later.

To enable us to adopt a line of treatment we must have some idea of the causation of these fatal results, so that, as far as is possible, we may avoid them.

Deaths have occurred during or immediately after an injection from heart failure, or a few days after from acute nephritis. I think they are due to the administration of salvarsan to cases where desperate measures were deemed advisable, or where the drug was contraindicated and should not have been given.

What concerns us now are the deaths which occur after repeated injections of salvarsan or neo-salvarsan in men in whom, after thorough examination, there were no contraindications found.

I will briefly review the explanations which have been adduced.

1. *Accumulation of the Drug.*

An overdose of arsenic is brought about by non-excretion of the first or previous doses, a further injection being sufficient to cause poisonous effects.

In one of the naval hospitals a fatal case occurred after the second injection, and in the brain arsenic was demonstrated by Fleet Surgeon Bassett-Smith.

On reading the reports on the cases at the end of this paper it will be evident that the removal of a considerable quantity of blood in these serious conditions produces a very marked beneficial result, and this fact is, I think, rather in favour of arsenical poisoning.

It is difficult to explain by this theory the fact that in most of the fatal results symptoms have not occurred until forty-eight hours after the second injection. Yet this interval followed in the case above where arsenic was found.

2. *A Form of Anaphylaxis.*

The first injection causes, by the destruction of the parasite, a substance which produces hypersensibility. On repeating the injection a week or ten days later more spirochaetes are killed, and a further output of these substances occurs, and dangerous symptoms of anaphylaxis result.

Perhaps quinine has the same effect in malaria, where blackwater fever results by selective action of the poison on the renal epithelium.

It is very difficult to produce evidence for or against this theory. If it is correct we are between the devil and the deep sea, for if we prevent it by giving injections at very short intervals we run the risk of accumulation of the drug, and if we space our interval, even I suppose to a year, we do not get rid of the danger.

3. *Damage to the Renal Epithelium causing Retention of the Products of Metabolism and Uraemia.*

I do not think this need be seriously considered. In none of my cases was the urine diminished. In the case that died there was a faint cloud of albumin only on boiling, and no inflammation of the kidney *post mortem*. One case which recovered gave albumin in the urine for one day only, the other never showed albumin at all. The case the nature of which was complicated by diphtheria did not give albumin tests, nor were the kidneys abnormal on *post-mortem* examination.

Contracted pupils and vomiting were absent, and in all the onset was sudden, resembling in every case that of an epileptic fit.

4. *Epileptic Manifestations.*

One case which recovered gave later a definite history of fits. The other case which recovered gave a family history of fits, but said that he had had none himself.

The parents of the man who died stated that to their knowledge their son had not had fits. A similar statement was obtained from the parents of the man who died with diphtheria.

I do not think that epilepsy explains these cases, yet I consider it dangerous to treat epileptics with salvarsan.

Stimulation of the Spirochaetes.

I think that the explanation of many cases is as follows: The first injection of salvarsan or neo-salvarsan has, instead of killing the spirochaetes, excited them to increased activity. This I know does occur. I have seen over a dozen cases in which no benefit followed the injection, but ten days later the throat and tonsils have become acutely inflamed and ulcerated, and in the lesions the specific spirochaetes were swarming. This is not the same as Herxheimer's reaction, which occurs a few hours after.

This late effect is not seen in lesions on the penis, because local treatment has been applied; occasionally it is seen in the skin, a rash suddenly appearing, and conforming to the syphilitic type.

One would only expect this to occur in tissues which are usually implicated, such as skin, mucous membrane of mouth, brain, nerves, arteries, and kidney; and if this is the case in one of these regions why should it not be so in the others? There is clinical evidence to show that this does happen.

The so-called neuro-recurrences are examples of this, and give rise to intractable headache, optic neuritis, deafness, and facial paralysis. One of my cases developed acute aortitis with considerable cardiac embarrassment, which cleared up with large doses of mercury.

What follows in these cases when a second injection is given?

1. The excessive local development of the spirochaete in the areas I have mentioned is prevented from doing permanent injury; or

2. An acute general toxaemia is produced causing marked local effects. This may be due to destruction of all the parasites by the arsenic, thus setting free a poisonous dose of endotoxin. I do not think this happens. The arsenic is not in sufficient quantity; the symptoms should come on within an hour of the repeated injection, and not forty-eight hours after.

I think the explanation is that the destruction of some of the spirochaetes allows an antigen in the form of endotoxin or other destructive product to pass into the circulation; this excites the body cells to produce spirochaeticidal substances (analogous to bacteriolysin) in excessive quantity. These substances in the presence of complement cause the sudden and complete destruction of the local masses of spirochaetes, and thus set free a large and intensely poisonous dose of endotoxin, which produces a general and local effect.

On *post-mortem* examination of the tissues so affected no spirochaetes are found. None were demonstrated in the brain examined by Fleet Surgeon Bassett-Smith, nor could I detect any in the arteries of my fatal case, although a most extraordinary condition of endarteritis was present.

This condition is analogous to Wolff-Eisner's "sterile death," where in acute bacterial infections the protective forces have caused the destruction of the bacteria to such an extent that a poisonous dose has been freed and the animal dies, and the blood is found to be sterile.

This explanation accounts for the interval of forty-eight hours between the injection and the onset of symptoms, it accounts for the sudden onset, and for the pathological conditions found *post mortem*—namely, cerebral inflammation, acute endarteritis, acute nephritis and suppression of urine.

If this is the correct explanation, then the vast importance of thorough mercury treatment for a month before giving the next injection is obvious. During this month excessive local developments of parasites will be got under control, or they will have made themselves evident and given us the needed warning.

We cannot, however, ignore Fleet Surgeon Bassett-Smith's analysis of urine in salvarsan cases, where for fourteen days arsenic was present, and the danger of accumulating doses must be recognized.

The Results of Treatment by Salvarsan and Neo-salvarsan.

I have pointed out the ways in which serious symptoms may develop, and indicated the lines on which we should proceed in order to avoid them.

Are we justified in advising our patients to run the risk entailed by salvarsan or neo-salvarsan treatment?

To decide this we must have some idea of the result obtained. I will take first the results as judged by Wassermann's reaction. I employed for these the original method, but used cholesterin antigen.

Of 25 cases of primary syphilis with negative Wassermann reaction 100 per cent. remained negative one year after treatment. Five of these developed fresh infections, and one of the five a third infection. They were treated by two injections of salvarsan and three months' mercury.

All the following cases were recommended to carry out mercury treatment until the Wassermann reaction had been negative for six months. I have ascertained the fact that mercury was given.

I will give the number of cases and the percentage showing positive reactions six or more months after treatment.

Primary Syphilis with Positive Reaction.

6 cases received one injection ...	100% positive.
74 cases received two injections ...	31% ,,
18 cases received three injections...	22% ,,

Secondary Syphilis under One Year's Duration.

184 cases received two injections ...	50% positive.
52 cases received three injections...	40% ,,

Syphilis of more than One Year's Duration.

135 cases received two injections ...	70% positive.
31 cases received three injections...	58% ,,

These 506 cases are all those on whom I was able to do reactions six or more months after their injections; they were all taking mercury at the time their blood was taken.

Up to two years after treatment I found cases becoming positive which I had placed in the negative columns; these had to be transferred to the positive, and for this reason the above results are better than the same batch of cases would give a year hence. How much is due to mercury and how much to salvarsan I cannot tell.

Doses.

The doses that I have employed have been for an average man 0.6 of a gram of salvarsan and 0.75 of neo-salvarsan, the first injection in this case being 0.6 gram; these have been given at intervals of seven to ten days.

All men are kept in bed on the day of the injection, and, needless to say, a very complete examination of every case is made before treatment.

Relapse.

Let us now examine the incidence of relapse cases—that is, those returning with active disease.

Of the first 1,000 cases only 22 have relapsed to my knowledge, the time since treatment varying from six months to two years. Of these, 10 had received only one injection. The significance of this lies in the fact that I only treated 80 men with one injection and 920 with two or more. Therefore it may be said that after one injection 12.5 per cent. relapse, and after two or more only 1.3 per cent.

I do not think that this is quite a fair estimate of the number of cases relapsing, as it was not possible to follow all, but it is accurate enough to be very suggestive as to the relative value of one and two injections.

Another very important result from the naval point of view is the immense reduction in the number of days a man is sick in hospital. The average per case has been twenty-two. Staff Surgeon Shaw has pointed out the enormous reduction that this form of treatment has produced when compared with the days of mercury alone. Every one knows the power that salvarsan has of rapidly healing lesions, and there would be no gain in my adding further instances.

The sense of well-being and fitness which most patients experience and retain for at least a year after salvarsan administration is a point worthy of note. As I have pointed out before, it allows a more thorough treatment by mercury.

Course of Treatment to be followed.

We have now summed up the results of the line of treatment which I have adopted. We are dealing with men presenting no contraindication to salvarsan injections, and who have been fully examined. What advice are we to give?

In primary syphilis with negative Wassermann reaction, cure the disease by intensive treatment, giving at least two injections of salvarsan at intervals of ten to fourteen days, or as soon as the arsenic is out of the urine when tested by Marsh's test. A three months' course of mercury must be started at the same time.

The danger of accumulation is avoided; anaphylaxis we cannot avoid; we can ascertain a history of epilepsy; the kidney theory I do not believe, and the danger, which I maintain is the most important, is absent, as no excessive increase of spirochaetes in a dangerous area is possible.

In primary syphilis with a positive reaction, and in the secondary stage of less than a year's standing, I advise one injection of salvarsan, followed a month later by another, and possibly a third, and mercury for a year after the reaction has been negative. In this stage of the disease to give injections at seven-day intervals is attended by a definite risk to the patient's life. As only about half of these cases attain a negative reaction, and we do not know how long they will keep it, I do not consider that we are justified in trying to stamp out the disease in this manner. It is on this ground that I advise the longer interval between injections and the protracted course. It holds out quite as good a chance of cure.

Syphilis of over One Year's Duration.

Where there are no active signs I do not consider it worth the patient's while to have salvarsan.

If there are active signs injections may be given at a month's interval. Mercury must be the chief means of preventing relapses.

Some cases will possibly lose their infection; in others the disease will remain latent for the patient's life, liable to recrudesce when circumstances are favourable.

Mercury should probably be continued at intervals for life.

Where the patient fully understands the risk entailed and expresses a very definite wish to have it, the following course may be given. Weekly injections of neo-salvarsan intravenously and mercury intramuscularly until a negative Wassermann reaction has been obtained two days after the last neo salvarsan injection. Seven to nine injections may be required to produce this. I have practically very little experience in this form of treatment, which is that recommended and carried out by McDonagh. For many reasons it is not practicable in the navy, where the prolonged treatment is being carried out.

Against this latter method the following arguments are adduced:

1. That an arsenic resistant strain of spirochaete is formed.

2. That the disease is simply rendered latent by prolonged treatment by driving the parasites into unapproachable tissues. This is almost analogous to quinine in small doses given to malarial patients. I think that this result is just as likely to follow a seven or nine weeks' course as a longer one.

Comparison between the two methods cannot be made until very careful statistics have been compiled. If there is an extra risk entailed in the frequent injections, then a corresponding increase in its value must be shown to compensate for it.

Throughout this paper I must ask the reader to consider that what I have said applies equally to salvarsan and neo-salvarsan, except where the latter is specially mentioned. I refer also to intravenous and in no case to intramuscular injections of either of the above drugs.

I wish to emphasize the value of a method of treatment which used to be frequently employed, but of late years has died out. This is arsenic by the mouth. In cases where salvarsan cannot be given it often produces a more rapid disappearance of syphilitic lesions than mercury.

CASES.

Epileptiform Convulsions (2 Cases).

One had a secondary syphilitic rash; the other was an earlier case, with glandular enlargement and primary sore. Wassermann's reaction was positive in both.

Typical epileptic seizures, in one case preceded by a cry, followed in both forty hours after the second injection of 0.6 gram of salvarsan. Fits became more and more frequent till they occurred every five minutes. In each case there was a stage of rigidity lasting one minute with considerable cyanosis. There was no clonic stage, and urine was not passed involuntarily. Complete unconsciousness was present. One case was bled to the extent of 20 oz., the other 15 oz. Marked improvement occurred at once; but in the latter case, where 15 oz. only were removed, the fits began again after an hour. Chloroform inhalations were given and no more fits took place. Both men remained unconscious for fifteen hours, but had completely recovered after twenty-four. One case had albumin in his urine, which was drawn off by catheter, but it disappeared next day. The other had none. Bromide was given per rectum.

One man gave a definite history of epileptic fits which he had had when ashore, and so had not been found out. The other admitted epilepsy in the family.

Convulsions followed by Death (1 Case).

This man had a two years' history of syphilis; he had received twenty-eight injections of mercury. The active disease had appeared four months before I saw him. The Wassermann reaction was positive. The first injection of 0.6 gram of neo-salvarsan was well borne, and his weight increased during the next week. Seven days from the first a second injection of 0.75 gram of neo-salvarsan was given. Forty-six hours after this, while in bed, an epileptiform seizure occurred, which was preceded by a cry; the blood tension was very high, convulsive movements frequent, followed later by opisthotonus. The respirations increased in rate to 36 per minute, and the pulse to 123, and thirty-six hours after the onset the patient died. Consciousness was never regained after the onset of symptoms.

Treatment consisted in bleeding, inhalations of chloroform, bromide, and removal of spinal fluid by lumbar puncture; this, however, was not under increased pressure.

Post mortem the meninges were congested; the brain substance appeared normal. The aorta (thoracic and abdominal), the internal and external iliacs, and the mesenteric arteries and coeliac axis showed a most marked condition of acute endarteritis.

The kidneys appeared normal, and all other organs. There was a faint cloud of albumin in the urine when boiled. The urine was passed, when alive, involuntarily; there did not appear to be any diminution in quantity. On microscopical examination no spirochaetes were found in the arterial walls. Cultures from the meninges and spinal fluid and blood were sterile.

Paralysis following Diphtheria (1 Case).

History of sore throat for a month. Syphilitic rash was present. Wassermann reaction was positive. Two injections of salvarsan with ten days' interval were given, each dose being 0.6 gram. Forty-eight hours after the second injection the throat, which was normal on admission, became inflamed, and the uvula covered with typical diphtheritic membrane, from which I obtained pure cultures of Klebs-Loeffler bacillus. Soon after this the patient complained of pain in the back, the legs became paralysed, then the sphincters, consciousness was lost, breathing became stertorous from paralysis of the soft palate; after this the left arm became paralysed, and finally the diaphragm, death ensuing eighteen hours after the onset of the first symptoms. There were no signs of cerebral irritation, the pupils were equal.

The *post-mortem* examination gave no clue to the cause of the illness. Cultures from brain and meninges were sterile. The liver and kidneys were tested for arsenic by Marsh's test, and no signs of the drug found. The urine contained no albumin. The clinical picture presented by this and the above case was totally different, and I do not consider that it was due to salvarsan, but that it was an acute diphtheritic toxaemia. The following case strengthens this diagnosis.

Man, aged 22, history of being sick at home for two weeks with tonsillitis. Returned to duty at the end of this time, but complained of pain in the legs. He was on this account sent to hospital. The day after admission both legs became paralysed, knee-jerks were lost, the paralysis rapidly spread, involving sphincters, arms, soft palate, tongue, and finally the diaphragm, and death occurred within thirty-six hours of admission.

This case had never had salvarsan, nor was there a history of syphilis. The last two cases were clinically almost identical; the second case also producing typical diphtheria bacilli, and the throat being characterized by the same sudden recrudescence to the typical diphtherial condition.

These cases point very strongly to diphtheria being the cause of Landry's paralysis.

Facial Paralysis.

This occurred suddenly two months after one injection. The Wassermann reaction was positive.

Deafness.

Two months after one injection for secondary syphilis almost complete deafness came on within a week. The condition was bilateral. A second injection caused an improvement, but the man had to be invalided. This case had been under mercury treatment since the first injection.

Optic Neuritis.

This man received an injection of 0.6 gram of salvarsan for syphilitic rash. Two months later he complained of pain in the eyes and headache. Ophthalmoscopic examination showed marked optic neuritis. The Wassermann reaction was positive. I at once administered a second injection of salvarsan. The result was wonderful; all symptoms rapidly disappeared, and the man was discharged to duty with normal vision, and has remained perfectly well for over eighteen months.

Cerebral Lesions.

Fleet Surgeon Bassett-Smith has kindly permitted me to add some notes made from his report on the pathological condition found on examination of the brain of a man who died after the second injection of neo-salvarsan.

The meningeal vessels were markedly congested. Oedema was present in the cortex of the frontal area.

On the right side the Sylvian vein was full of hard clot extending half-way up the frontal lobe.

The centrum ovale on section showed punctate haemorrhagic spots. The internal capsule of both sides showed haemorrhagic areas with acute capillary congestion. The pons and medulla showed the same condition. Arsenic was found to be present.

Microscopically.—The infiltrated areas showed congestion of all the small vessels, with collections of blood cells round about the capillaries.

In portions impregnated with silver by Levaditi's method no spirochaetes were detected.

Sections of the larger arteries in the Sylvian fissure showed periarteritis and endarteritis.

Sections of the thrombosed Sylvian vein did not indicate an infective origin.

I wish to express my indebtedness to Fleet Surgeon Bassett-Smith, C.B., and also to Surgeons Campbell Ross, W. G. Custance, and V. J. Richardson, all of whom have largely participated in the work done at Chatham.

"STANDARD" OPAQUE MEAL FOR RADIOGRAPHIC EXAMINATIONS.

By ALFRED C. JORDAN, M.D.CANTAB., M.R.C.P.

FOR radiographic examinations opaque meals are administered with several different objects in view. The purpose may be to elucidate physiological principles, as in the examination of the healthy stomach, and various kinds of meal must be used to ascertain the effect of different foods on gastric peristalsis, and on the rate at which the stomach empties itself. In all such investigations the presence of the opaque substance (usually a salt of bismuth or the sulphate of barium) modifies the character of the food so greatly (making it unpleasantly dry and earthy) that the conclusions cannot be assumed to be directly applicable to the case of ordinary meals. We are driven to determine the behaviour of the healthy stomach with our opaque meals, and to endeavour to discover which deviations from the usual behaviour are due to organic disease.

In my own case the opaque meal is almost always given to ascertain the presence of disease, or abnormality of structure or of function, and in the vast majority of cases I examine not merely the stomach but the entire length of the alimentary tract from the mouth to the rectum. My method of procedure has been evolved, little by little, as my experience has grown, the main object being to obtain the greatest amount of trustworthy information. To attain this object I have made a practice of following my patients to the operating room whenever an opportunity has arisen. In this way I have been able to compare the appearances shown in my radiograms with the condition of the parts as actually revealed at the operation.

The "Standard Meal" I am about to describe is that used by me in the majority of cases in which I make a complete investigation of the digestive tract, and this includes examinations for intestinal stasis.

METHOD OF EXAMINATION FOR INTESTINAL STASIS.

The patient takes his usual breakfast. About one or two hours later he comes for his first examination.

An emulsion is prepared consisting of bismuth carbonate, 4 oz.; sugar of milk, 1½ oz.; water in amount sufficient to make an emulsion which is not thick.

The whole drink makes less than a tumblerful. In the case of big subjects, 5 oz., or even 6 oz., of bismuth carbonate are given, with a correspondingly greater amount of sugar of milk and water; even this makes no more than a tumblerful. The water should not be quite cold, especially in winter. I have not had a single case in which this dose has produced the slightest untoward result.

The sugar of milk in this "standard meal" has a threefold function: (1) To make a satisfactory emulsion, (2) to increase the bulk of the meal, and (3) to make the meal pleasant. In some cases it has a mild laxative effect.

The patient is first examined upright on my revolving saddle seat with canvas back.[1] The chest is examined, first in the anterior view, and then in the right anterior oblique view. While in this position (R.A.O.) the patient begins to drink the bismuth emulsion, and its course down the oesophagus is well shown; if this appears normal, and the bismuth begins to enter the stomach at once, the patient is swung round to the anterior position, and the level of the great curvature of the stomach is noted as the first portions of bismuth reach it. The final level of the great curvature is lower, the difference being due to the weight of the bismuth.

After the vertical examination the patient is examined on the couch—supine, supine after lying on the right side, prone. All details regarding the size, shape, and position of the stomach and duodenum may be determined at this examination, and accurate observations may be made of the motor activities of these organs. Subsequently the bismuth passes through the small and large intestines, and enables them to be studied to great advantage. My results have been published from time to time.[2]

OBJECTIONS TO THE METHOD EXAMINED.

Several objections have been raised to my method. I propose to consider them individually.

1. "The bismuth carbonate neutralizes the free acid in the stomach." I use it for this very reason; it overcomes (partially at any rate) the pyloric contraction, whether physiological or pathological, and allows the bismuth to enter the duodenum in sufficient amount to give a good view of it (the duodenum), and to permit of an accurate study of its form and functions.

1A. "But if you neutralize the free acid in the stomach you diminish the peristaltic activity of the stomach." A few inconclusive experiments have been described in support of this contention, but an extended experience with bismuth carbonate has shown me that active peristalsis may be observed when this salt is used, while the excessively powerful peristalsis and the reversed peristalsis that occur in some cases of pyloric stenosis may be demonstrated to perfection with an emulsion of bismuth carbonate given in the way I have described.

2. "If you give the bismuth when there is food in the stomach, and allow more food to be taken before all the bismuth has left the stomach, you cannot form correct estimates of the rate at which the stomach empties itself." True, but the rate of emptying of the stomach is not a point of paramount importance; certainly it is of far less importance than a proper view of the duodenum, and the duodenum cannot, in my experience, be properly examined if the bismuth (or barium) be given on an empty stomach, for in the latter case the bismuth has to encounter persistent spasm at the pylorus—a physiological effect which I have recently described and explained.[3] Further, even with barium given on an empty stomach, the rate at which this organ rids itself of the barium varies greatly on different occasions in the same subject. One day the barium may be all out in two or three hours, while another day it may take six or eight hours, or even longer. Patients do not appreciate being kept without food so long! There is a further grave objection to withholding food beyond the usual time: one of the most powerful factors in causing the contents of the large bowel to advance is the taking of food. It follows that the results obtained for the rate of passage through the intestines are seriously invalidated in cases in which food is withheld.

3. "If you place a large dose of bismuth in the stomach, and then cause your patient to lie on the right side, the duodenum will become unnaturally distended and will give a picture which does not correspond with the actual state of affairs." The answer to this is conclusive. All my patients are examined in this way. My reports show that in a dozen patients I get evidence of marked duodenal distension in one or two only (40 in the last 334 patients);

and in these I always find associated changes in the lower ileum, and usually in the large intestine. In the normal cases the duodenum is small and short, and the bismuth is seen to pass through it by active peristalsis, without delay or regurgitation, into the jejunum as soon as the patient is placed in the supine posture from the right lateral position. Moreover, my results, both normal and abnormal, are repeatedly checked at operations, and the actual state of the duodenum is found to agree closely with my previous account of it. In a thin subject I have seen the duodenum dilated and showing strong "writhing" peristalsis though it contained no bismuth—in fact nothing but Benger's food.

4. "The larger the dose of bismuth the greater will be the delay in its passage through the intestines; consequently the intestinal stasis, if present, will seem to be greater than would be the case with ordinary food, and stasis may appear to be present when there is no stasis to ordinary food." The former part of this assertion is true to a slight extent (though the laxative action of the sugar of milk prevents delay in most cases), but as all my patients are given the same dose of bismuth (never less than 4 oz. in an adult), the normal time of passage is well known to me, and all my results are comparable. With a smaller dose it is impossible to obtain satisfactory pictures of the duodenum, the terminal portions of the ileum, the appendix, or even the large intestine.

5. "An emulsion does not fill the stomach sufficiently to give a good picture of its outline." "An emulsion does not mix uniformly with the gastric contents, but falls to dependent parts." The former assertion would be true if the emulsion were given on an empty stomach; this is not my practice. The latter statement is partially true; but it is true of almost all opaque meals, and no fallacy is introduced provided the observer checks his vertical and supine examinations with a view in the prone posture. The various changes of position—vertical, supine, right lateral, prone—ensure the proper mixing of the gastric contents with the bismuth.

By allowing the patient to take his usual meals throughout the investigation a true picture is obtained of the usual progress of the ingesta through the alimentary canal.

Advantages of an Emulsion.

The advantages of an emulsion over a solid meal are numerous.

(*a*) *From the Patient's Point of View.*—A smooth emulsion, slightly sweetened by the presence of lactose, is incomparably pleasanter, easier, and speedier to take than a bowl of porridge, or gruel, or bread and milk containing bismuth or barium. Many of my patients have been given one or other of these solid meals by other observers previously, and their verdict is absolutely unanimous. As a rule they volunteer the statement unasked. This refers to a porridge containing only 2 oz. of bismuth or barium; if 4 oz. were to be given in this way, the bulk of the meal would have to be so great that no patient could take it. In the case of barium sulphate, I find it necessary to give no less than 10 oz. of this substance in order to get the same pictures of the intestines as with 4 oz. of bismuth carbonate. Many patients (for example, cases of gastric ulcer) cannot or will not take a solid meal, or their doctor (very properly) will not permit it. A large dose of bismuth carbonate is decidedly soothing to the stomach and intestines. This is a property of great value, many of the patients being subject to nausea, vomiting, flatulence, colic, etc. It would be impossible to follow a test meal through the alimentary tract in some of these subjects but for the beneficent action of the dose of bismuth carbonate. It is a daily occurrence for a patient to volunteer the statement that he (or she) had a better appetite for lunch after the bismuth than had been the case for many months. There is certainly less flatulent distension during the presence of the bismuth in the large intestine, and even if there be no evacuation of the bowels for four days or more, the patients are able to tolerate it without discomfort, although they could not go so long under ordinary conditions without suffering from nausea, pain, distension, headache, etc.

(*b*) *From the Observer's Point of View.*—The time taken to eat a bowlful of porridge or bread and milk might well be spent more profitably, and doctors bringing patients have often complained to me of the loss of time inflicted on them in this way by some radiologists. The œsophagus is not observed, and as a rule no examination of the chest is made, the observer concentrating his attention on the stomach at once. No view of the duodenum is obtained—a most important omission; this is due, as I have often explained, to the spasmodic contraction set up at the pylorus by a solid meal. The difference is most striking, for with an emulsion of bismuth carbonate given after a meal the duodenum is shown well filled with bismuth, and its behaviour may be studied with certainty and precision as the peristaltic waves pass along it, forwarding its contents into the jejunum in normal cases. The cheapness of barium sulphate does not compensate for the loss of these advantages.

Conclusion.

Those observers who are content to examine the stomach only, and do not seek information regarding the duodenum or the ileum, can give any opaque test meal they think best; in my own case, having come to the conclusion that the whole alimentary tract should be investigated in each case, I hold that an emulsion of carbonate of bismuth should be given—composed as stated in the early part of this paper—and administered in the manner there described, and the examinations should be carried out as I have described in my papers on intestinal stasis and gastric ulcer.[2 3]

For the purposes of an opaque enema I am now in the habit of using 12 oz. of barium sulphate mixed with kaolin (Bolus alba, *German Pharmacopœia*) and warm water.

"Butter-milk" is largely used in America in the composition of opaque meals; I have never tried it, but I imagine it would increase the acidity of the gastric contents, and so prevent the proper filling of the duodenum.

I am indebted to Dr. F. M. McPhedran, jun., of Toronto, for many valuable suggestions after reading the rough notes for this paper.

References.

[1] X-Ray Examinations for the Physician, *Archives of the Röntgen Ray*, August, 1909. [2] Radiographic Demonstration of Lane's Ileal Kink, *Practitioner*, April, 1911. Duodenal Obstruction as shown by Radiography, BRITISH MEDICAL JOURNAL, May 20th, 1911. Radiography in Intestinal Stasis, *Proc. Roy. Soc. Med.*, December, 1911. The Duodenum and the Appendix in Intestinal Stasis, BRITISH MEDICAL JOURNAL, June 1st, 1912. Intestinal Stasis, *Practitioner*, February, 1913. [3] Gastric Ulcer, *Proc. Roy. Soc. Med.*, 1913, vol. vi (Electro-therapeutic Section), pp. 117–138. Alimentary Toxæmia (Contribution to Discussion on), Ibid., vol. vi, No. 7, May 1913.

SOME ACUTE ABDOMINAL CASES.

BY

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SURGEON TO THE SOUTH DEVON AND EAST CORNWALL HOSPITAL, AND CONSULTING SURGEON TO THE EAST CORNWALL HOSPITAL, BODMIN, AND TO THE TAVISTOCK HOSPITAL, DEVON.

THESE cases have been seen recently, and I have considered them worth recording as acute abdominal conditions.

Cases Nos. I and II presented the usual symptoms of an acute abdomen, the remaining four had abdominal symptoms, which were acute and permitted no delay. The distinction I draw between the acute abdomen and those cases presenting acute abdominal symptoms is, with the former there is general peritonitis, due to some cause such as rupture of stomach or intestine either by disease or trauma, rupture of abscess, etc.; and the latter, where there is no general peritonitis, and the acute symptoms are caused by some form of internal strangulation of gut, cyst with twisted pedicle, ectopic gestation, intussusception, etc.; but in either group of cases the word "acute" means no delay. The difficulty of diagnosis is usually great, and is often made more difficult by delay and by the administration of some form of opiate.

CASE I.—*General Peritonitis: Cause Doubtful:*

E. H., aged 70, male, was seen, in consultation with Dr. Thomas, during the afternoon, with a history of an inguinal hernia, which had been reduced the same morning, but vomiting had continued with marked abdominal tenderness; the knees were drawn up and the pulse was 140. I considered that, although the hernia had been reduced, strangulation had not been relieved.

The patient was conveyed in a motor ambulance to a nursing home, and I operated at 8 p.m. the same day, assisted by Dr. Thomas.

Incision was first made to explore the site of the inguinal hernia on the right side. On opening the sac, thin, purulent, non-smelling fluid escaped. The wound was left open and a

drainage tube sutured in. A median subumbilical incision was then made; a quantity of the same fluid escaped. The pelvis appeared full; this was all swabbed out and a search made for a primary abscess. The appendix vermiformis was normal; some thickening of the sigmoid was felt and thought to be probably malignant, causing suppuration in the extraperitoneal cellular tissue, which had ruptured into the peritoneal cavity. The condition of the patient forbade further search. A large drainage tube was passed into the pelvis and another of the same size through a stab incision in the left iliac fossa. The central incision was then closed except at the lower angle.

The patient rallied well, drainage was free, and recovery, though slow and impeded by chronic bronchitis, was satisfactory.

The patient left the nursing home in six weeks. The central and right inguinal incisions firmly healed, but the discharge from the stab wound in the left iliac fossa persisted, and was occasionally faecal and needed dressing once in twenty-four hours. The bowels acted well, assisted by laxatives and enemota. He was seen three months later in excellent health; the sinus in the left iliac fossa was still discharging, but caused little inconvenience.

CASE II.—*Acute Peritonitis (Traumatic).*

E. G. H., aged 45, a strong, heavy-built man, was admitted under my care at the South Devon and East Cornwall Hospital with the following history:

Two days prior to his admission he was unloading some heavy grates, one of which struck him a glancing blow on the lower abdomen; this happened at 11 a.m.; he did not think much of it, and had his dinner at noon and worked on till 5 p.m.; pain then came on, which lasted through the night. He was admitted to hospital the next morning and was seen on admission. The abdomen was not distended, but was generally tender. The pulse was 120, but increased in a few hours to 140. The abdominal symptoms becoming more pronounced, I was asked to see him at 8 p.m.

It was quite evident that here was an acute abdomen, but the history was misleading, and I was at a loss to know what had happened. I therefore opened the abdomen to see, making the subumbilical median incision; a quantity of small gut with flakes of lymph on the surface, and much non-smelling, turbid fluid escaped on incising the parietal peritoneum; there was no free gas. The intestines were brought outside the abdomen, wrapped in warm towels, and carefully searched for injury, but the only sign of injury was some superficial ecchymoses on the lower ileum. Multiple enterotomies were made, and some pints of foul thin faecal matter was drawn off. The appendix was normal; drainage tubes were placed in the pelvis and both kidney fossae; the parietes were closed in layers.

Excellent recovery ensued, and he left hospital six weeks later. He was seen four months after leaving hospital in robust health, doing his usual heavy labourer's work.

I am strongly of opinion that the multiple enterotomies played an important part in the recovery of this patient, they certainly much facilitated the return of the intestines

CASE III.—*Dermoid Cyst of Ovary with Twisted Pedicle.*

E. C., aged 24, seen in consultation with Dr. Anderson Bodmin, was six months pregnant. She complained of a sudden acute attack of pain in the lower abdomen twenty-four hours before I saw her. There was no history of indigestion or appendix attacks, and the pregnancy had advanced to its present date in a normal way. The fundus of the uterus could be made out just above the umbilicus, the abdominal wall was rigid; temperature 99° F., pulse 130. On vaginal examination a large semifluctuating tumour was found to occupy Douglas's pouch; it appeared quite separate from the uterus. Her condition was sufficiently acute to justify immediate operation.

Operation.

The patient was placed in the high Trendelenburg position and a 6 in. median subumbilical incision made; the pregnant uterus was pushed forwards and outside the abdomen, and the intestines packed up; a dark-coloured tumour occupied the pelvis and was connected to the right cornu of the uterus by a tightly twisted pedicle; light adhesions were sponged off, and the mass, which proved to be a dermoid cyst of the right ovary containing hair and teeth, delivered.

The manipulations had no effect on the pregnancy, which, Dr. Anderson reports, had a satisfactory ending at the ninth month.

CASE IV.—*Appendix Abscess without Localizing Symptoms.*

J. W., a young farmer, aged 35, I saw at a farmhouse in consultation with Dr. H. Davis of Callington, with the following history. He had been taken ill five days previously with vomiting and abdominal pain; a chemist prescribed some medicine; the symptoms continued, and Dr. Davis was called in. He found the temperature 100.6°, the pulse 120, the face flushed and pinched, persistent vomiting of a biliary character and faecal odour, the abdomen distended and tympanitic, with some dullness in the right iliac fossa; McBurney's point was very tender and the bowels confined. Dr. Davis considered it a case of appendicitis, and I was asked to see him next day I found the abdomen board-like; the iliac fossae were resonant respiratory movement absent; there was marked visible peristalsis; rectal examination was negative.

Operation.

I regarded the case as intestinal obstruction, possibly due to appendix trouble but more likely to some other cause. I therefore made a median subumbilical incision; distended small intestine presented; this was packed away and search made for the cause of obstruction. With some difficulty the caecum was brought into view, and the appendix was found coiled up in omentum and enveloped in foul pus. This was dealt with in the usual way, the stump of the appendix buried in the caecal wall, the site of the abscess cavity drained through a stab wound in the right iliac fossa, and the central incision closed.

The central incision in this case was unfortunate, as it added to the difficulty of dealing with the appendix. The after-history is unimportant. The patient had quite recovered in six weeks.

CASE V.—*Appendix Vermiformis Strangulating Ileum.*

A healthy child, aged 3½, was seen in consultation with Dr. Webb of Looe, who informed me that the illness had begun a fortnight previously with constipation, vomiting, straining at stool, passing of blood and slime, and pain in the right iliac fossa. The case was thought to be an intussusception, and I was asked to see the child with a view to operation. The child looked very ill, the legs were drawn up, no tumour could be felt, as the abdomen was rigid. The history pointed to some acute obstruction, and probably an intussusception. An incision 3 in. long was made over the right rectus. On opening the peritoneal cavity no intussusception was found, but a loop of dark-coloured gut was seen lying in the right iliac fossa, and on further search it was found to be retained there by a tight cord which proved to be the appendix, which was adherent to the brim of the pelvis. The appendix was removed and the stump buried in the caecal wall. The nipped gut was in good condition; a large stercolith occupied the lumen of the appendix. There was no peritonitis, but the internal strangulation by the appendix caused symptoms similar to intussusception.

CASE VI.—*Retro-colic Hernia.*

I. B., aged 2½, had always been healthy till the present illness, which began three days before I saw the child with constipation, passing mucus and blood; there was some resistance in the right iliac fossa, and the right rectus was decidedly on guard. I was asked to see the child late at night by Dr. Reveley Clarke with a view to immediate operation. The child looked ill, having the acute abdominal aspect; it was evident that no time should be lost, and it was conveyed to the hospital, where I opened the abdomen two hours later. A small incision 2 in. long was made over the right rectus, with a view to diagnosis; the large intestine was collapsed, the small distended; the appendix and ileo-caecal junction were normal. The incision was enlarged upwards and a mass felt behind the caecum. Small gut was noticed entering the retro-caecal fossa; by gentle tension on this gut and pressure on the outside of the caecum 15 in. of ileum was delivered in fair condition. It was washed with saline and returned into the general cavity and the parietes closed.

The child left the hospital well in three weeks.

I regret I did not remove the appendix in this case; the retro-caecal fossa lies between the ileo-appendicular fold and the mesentery of the appendix, and would have been obliterated by removal of the appendix with its mesentery.

THE late Dr. F. W. Forbes Ross left estate valued at £1,077 gross, with net personalty £523.

THE centenary of the discovery of iodine by Bernard Courtois of Dijon was celebrated in that city on November 9th, when M. A. C. Matignon, Professor of Mineral Chemistry in the Collège de France, delivered an address on the history of the discovery and on the development of the use of iodine during the century. Courtois actually made his discovery in 1811 when examining the waste liquors produced in the manufacture of sodic carbonate from the ashes of seaweed, but did not report it to the Académie de Sciences in Paris until 1813.

COLONEL GORGAS, who has accepted the invitation of the Chamber of Mines to advise as to the sanitation of the Rand, with special reference to the prevalence of pneumonia, sailed from Southampton on November 15th, and will proceed direct from Capetown to Johannesburg. He is accompanied by Dr. Darling and Major Noble, who are associated with him in the sanitary administration of the Panama Canal zone. On November 14th Mr. J. Howard McFadden entertained a party of guests, including Sir Thomas Barlow, Sir Francis Champneys, and Sir Ronald Ross, at a private dinner to meet Colonel Gorgas and his companions.

EIGHTY-FIRST ANNUAL MEETING

OF THE

British Medical Association.

Held in Brighton on July 23rd, 24th, and 25th.

PROCEEDINGS OF SECTIONS.

SECTION OF BACTERIOLOGY AND PATHOLOGY.

J. W. Eyre, M.D., M.S.Lond., President.

PAPERS ON ANAPHYLAXIS.

I.—W. E. Dixon, M.D., F.R.S.,

Professor of Materia Medica and Pharmacology, King's College.

It has long been recognized that from time to time the injection of a substance of a protein nature, such as blood serum, into animals or man may cause poisonous symptoms, though such an injection is quite without effect in the vast majority. This susceptibility was said to be due to individual idiosyncrasy—a word which explains nothing; it is now known to be a condition of protein sensitization. This condition was familiar to us in other ways: The incubation period of a second vaccination is shorter than that of the first; tuberculin and mallein are without effect when injected into normal animals, but the same injection causes a marked poisonous reaction if made into tuberculous calves or horses suffering from glanders respectively.

Charles Richet in 1902, whilst investigating the action of certain poisons from the sea anemone (congestin and thalassin), noted that after a dog had received a first injection of one of these substances, not sufficient in amount to produce any observable effect, a second injection some three or four weeks later rendered the animal extremely ill, and often caused its death. Therefore the first injection had produced a condition which was the opposite of protection, and to this hypersusceptibility or supersensitiveness Richet gave the name "anaphylaxis." It was soon shown that this reaction was not peculiar to *congestin*, but was general for all substances of a protein nature, just as the formation of antibodies and the precipitin reaction are general for all proteins; in other words, the injection of proteins, toxins, serums, and the like can all give rise to this condition. After an animal has received an injection of some protein it is hypersusceptible to that protein and to no other, the reaction being specific for each protein. The tissues do not react in this manner to drugs and chemical substances of known constitution. Certainly it has been stated that if blood serum from patients who are supersensitive to antipyrin or iodoform is injected into the guinea-pig, this animal also will exhibit an increased sensitiveness to these drugs; this condition, however, bears no true relation to anaphylaxis.

One remarkable fact is the extremely small dose of the sensitizing protein (antigen) necessary to produce the anaphylactic state. A guinea-pig which has received one hundred-thousandth part of a cubic centimetre of such an inoffensive serum as that of the horse is never again quite the same animal. If, let us say in a month's time, it again receives an injection, which would be quite without effect on a normal animal, it may die in a few minutes. Even such a minute dose as 0.000,000,05 gram of egg-white has been stated to be enough to induce the anaphylactic state in the guinea-pig; large doses act quite well, but the latent period before the condition is observed is longer. The protein molecule is the essential reacting agent, since pure crystalline egg-albumin will produce anaphylactic shock in a guinea-pig which has been sensitized to egg-white. The conditions, then, essential for anaphylaxis are the introduction of a substance of a protein-like nature into the body, and of which it is not a normal constituent, followed after a suitable interval by a second dose. The interval between the first and second injections should be not less than a week; in man the full effect is not reached till a much later period, whilst in the dog the maximum effect is about the fifteenth day. This condition of supersensitiveness when once present lasts for a variable time in different animals—from some weeks in rabbits to some years in guinea-pigs. Within certain broad limits the symptoms of anaphylactic shock are the same for each animal no matter what the nature of the sensitizing protein employed. Hence it has been argued that these identical symptoms probably require a common cause, and this is one reason why the hypothetical poison, anaphylatoxin, has been requisitioned. All tissues do not necessarily respond to antigen in the same degree. The liver in the dog is affected by antigen to a greater extent than other organs, and in this instance it certainly looks as if some movable poison is formed, as the other tissues are affected secondarily from the liver.

The *symptoms and signs* of anaphylactic shock can be divided into three groups—circulatory, muscular, and local.

Circulatory symptoms are perhaps the most characteristic: the arterioles are paralysed, the vessels become widely dilated, and as a direct result blood pressure falls. The heart-beat is weaker, but not sufficiently weak to cause the fall of blood pressure. The liver is mainly responsible for this condition, since anaphylactic shock is ill-defined or absent if the liver is excluded from the circulation. These circulatory effects are especially characteristic in the dog and cat. It is not known how the liver induces shock; its vessels are dilated and its vascular volume is much increased, but of course this is not enough to account for the changed blood pressure, and it seems not unlikely that toxic products are liberated in relatively large quantities here which cause a secondary intoxication. No doubt some of the nervous symptoms which have been described are secondary effects of the low blood pressure.

Plain muscle tissues in certain situations undergo tonic contraction. This effect is especially well seen in the bronchioles and occurs in all animals, guinea-pig, rabbit, cat and dog, but it is peculiarly intense in the guinea-pig because in this animal the bronchioles are lined with a thick and folded mucous membrane which effectively blocks the lumen when constriction occurs; it is well marked in rabbits, but perhaps less defined in cats and dogs. After an intravenous injection of the antigen the bronchioles close up immediately and atropine, which paralyses the motor nerves to the bronchiolar muscles, has no influence either in preventing or relieving the spasm. Some of the nervous symptoms, convulsions, tonic and clonic spasms, may be regarded as secondary results of asphyxia. Other plain muscle which may be thrown into contraction is that of the stomach and intestines, and vomiting and diarrhoea is a not uncommon effect of anaphylactic shock in the dog. The uterus also enters into tonic contraction. In all these instances the only essential factors, so far as we know for certain, are the sensitized plain muscle and the antigen.

Local effects generally take some hours to manifest themselves. The experiments of Dunbar and Weichardt are instructive; each was injected under the skin with a suspension of pollen grains. Dunbar was a martyr to hay fever, and almost immediately he experienced an acute attack, with the coughing, sneezing and congestion of the mucous membranes, congestion and swelling of the face, and general urticaria; the attack passed off in twenty-four hours. Weichardt being normal was not influenced by the injection. Skin symptoms such as itching and oedema are not uncommon in cattle, and form one of the milder group of symptoms in man. A second injection of antigen subcutaneously in the rabbit sometimes causes local oedema and sloughing at the seat of the first injection. Bloch has shown that the reaction between antigen and sensitized tissue is strictly local; he transplanted the skin from a subject known to be highly susceptible to trichophyton upon a normal person. After the skin had grown healthily again it was found that the transplanted portion was still supersensitive to trichophyton, whilst the rest of the skin was normal. Tuberculin, which acts like anaphylatoxin in the tuberculous, can be used also to obtain a local reaction—Calmette's ophthalmo-reaction, and von Pirquet's skin reaction. The anaphylactic symptoms last only a few hours, and the animal either recovers rapidly or dies.

The explanations which have been offered to account for

anaphylaxis fall naturally into two groups—the side-chain view and the ferment view.

The supporters of the side-chain view point out that the production of anaphylaxis and also of antibodies runs a parallel course, and the incubation period is roughly the same, and they suggest that the symptoms of anaphylactic shock are due to a direct combination of the antigen with the cells of the sensitive animal. They believe that the sessile receptors which are the precursors of antibodies are the basis on which supersensitiveness depends. A cell which carries an increased number of these sessile receptors free to combine with a foreign protein is hypersusceptible to that protein.

The second or ferment view depends upon three facts. First, that all protein molecules contain a poisonous group which can be liberated by an appropriate ferment. Secondly, that the introduction of a foreign protein into the animal body determines a new ferment which splits up that protein and no other. And thirdly, that the symptoms of anaphylactic shock and those resulting from the injection of these products of partial protein hydrolysis (peptones) are identical. Supposing that some serum from an anaphylactic guinea pig is examined for the presence of such peptones, they will not be found present until after the addition of a little antigen, when proteolysis commences immediately, though the results as shown by peptone formation are not very manifest until after fifteen minutes.

These are the facts; the theory consists in assuming that these products of proteolysis are the cause of anaphylaxis. It may be assumed that the sensitizing injection leads to the formation of a specific ferment, and that the protein of this injection is so slowly digested that the poison set free at any one time is not enough to produce any obvious effect. This view affords an explanation why such minute sensitizing doses can produce such large effects after the reacting dose. It is quite easy to test the effect of antigen directly upon isolated sensitized plain muscle of the guinea-pig. Schultz tried the effect on the intestine and Dale on the uterus. The organ was washed free from blood and suspended in Locke's fluid, so that the automatic contractions could be recorded, and it was found that the addition of traces of the sensitizing protein of the fluid caused marked contraction, whilst all other proteins were without effect. The contraction is immediate, and therefore Dale argues that it is unlikely to be caused by a ferment liberating some toxic cleavage product, because this would take time. A gradual onset of anaphylactic symptoms is perhaps the rule in the dog, but in the guinea-pig and rabbit there is no delay. Although this criticism is certainly valid and cogent, especially as Abderhalden has shown that fifteen minutes' incubation are required between sensitive tissue and antigen before peptones can be detected, yet it is not completely destructive, and especially should it be remembered that such a strip of plain muscle probably carries a large amount of ferment in proportion to the amount of antigen necessary to cause the effect, and further, that the peptones would be liberated under ideal conditions for producing an effect. Any fat-free protein when heated to 78° C., with 2 per cent. caustic soda in alcohol is split up into two fractions, one of which, a poisonous fraction, remains in solution in the alcohol, and when injected into animals causes the symptoms of anaphylaxis. The addition of antigen to sensitive serum induces proteolysis, and whatever the nature of the antigen the poisonous substance has identical physiological properties. To this substance, which is sometimes regarded as precipitin, the name of "anaphylatoxin" has been given. It is easy to prepare a similar toxic substance from the normal guinea-pig's serum by digesting it with china clay, agar, or even an emulsion of nerve-tissue, and in each case after standing the supernatant liquid contains an anaphylatoxin.

Here, then, is a third view as to the cause of anaphylaxis, that the poison is produced by physical means due to the adsorptive properties of a colloid. It is, then, at least possible that the formation of anaphylatoxin from mixing antigen and serum may be the result of some physical change in the state of aggregation of the colloids inducing, as Traube believes, a change of surface tension. Other evidence is collecting which supports this view; the injection into the circulation of animals of colloidal solutions of inorganic substances produces some of the characteristic effects of anaphylaxis; a solution of common salt given by the mouth to sensitive guinea-pigs for some days inhibits the action of antigen; the administration of the drugs belonging to the group of indifferent hypnotics and anaesthetics, the narcotic power of which run parallel with their effect on surface tension, will prevent anaphylactic shock at least for a time. These facts certainly suggest strongly that the reaction between antigen and sensitized serum is not chemical. It may be noted before proceeding that if the serum from a supersensitive animal be injected into a normal animal, that property is transferred, and the supersensitive state is also transmitted by the female to her progeny.

Clinical Significance.

Anaphylaxis is not merely a question of academical interest, but is also one of considerable practical importance; a person may be rendered hypersusceptible to a disease at will. It is true that few people show any decided supersensitiveness to an injection of ox serum even though they may be meat eaters; but then we do not absorb our protein as such, but as the relatively simple amino-acids.

Attention has been drawn already to hay fever, and spasmodic asthma may be cited as a condition easily brought about in the supersensitive. In this connexion cat asthma, which is generally regarded as reflex constriction of the bronchioles from the irritating odour of the cat, assumes a new significance. Horse asthma is also not unknown, and there are those who suffer from asthmatic attacks merely from riding behind horses. Expired air has been shown to contain a protein which is able to sensitize animals, and this, when inhaled, may account both for the local anaphylaxis in asthma and for the condition in those cases in which there is hypersusceptibility to horse serum. In the latter instances all the symptoms of true anaphylaxis may, within a few minutes, follow a first injection of horse serum. This condition is, however, one of great rarity. These cases of true anaphylaxis must not be confounded with serum disease, which is generally characterized by fever, a rash, and some oedema; here the larger the dose of serum administered the greater the chance of an attack, but the trouble rarely arises until a week or ten days after injection. Calcium salts, even when given by the mouth, are said to check this condition.

A relatively large number of people exhibit some supersensitiveness to foods; some cannot eat eggs, especially if they are lightly boiled, because cutaneous rashes, migraine, and alimentary disturbances occur. This idiosyncrasy is often seen in members of the same family, and it may be hereditary. It is worth noting that such an alimentary anaphylaxis to eggs has been obtained experimentally. Mussels, plaice, crayfish, oatmeal, strawberries, and other foods occasionally cause similar effects. In the supersensitive these symptoms are rapidly and certainly produced; minute doses only are required, and the symptoms are identical with those which are seen in the lower animals produced by experimental anaphylaxis. Sometimes, though not often, an apparent cause for these conditions can be found; thus Billard mentions a child nourished on horseflesh, which showed typical anaphylactic shock after an injection of antidiphtheritic serum.

The means by which such shock can be eliminated deserves some consideration. Sometimes it is urgent that a patient who has received a dose of serum at some earlier period should now receive a second dose. For example, during an epidemic of diphtheria at a school some of the scholars may receive a prophylactic injection of antitoxin and at a subsequent period may contract the disease. It may be argued that the principle of prophylactic injections under these circumstances is wrong, as we may be masking a carrier, but still the practice is adopted and must be considered. In such cases an antitoxin prepared from some animal other than the horse can be substituted for the ordinary antitoxin, and some of the manufacturers prepare an ox serum for this purpose. If a patient receives a series of injections at short intervals, not longer than five or six days apart, anaphylaxis does not occur. If it is doubtful whether a patient is supersensitive to horse serum, several methods exist for determining this factor. Perhaps the simplest is to obtain 2 c.cm. of the patient's serum and add this to 1 c.cm. of

horse serum. If this mixture is incubated for fifteen or twenty minutes anaphylatoxin is formed provided the patient is sensitive, and in this case its injection into a guinea-pig will result in anaphylactic shock. In man the period of maximum danger extends from one to six months after an injection of serum, and the reaction may not disappear for a year. A principle of treatment which is frequently adopted in cases in which anaphylactic shock is feared consists in a preliminary injection of 0.1 c.cm. If after three hours no untoward symptoms appear a full dose may be given.

II.—G. Sims Woodhead, M.A., M.D.,
Professor of Pathology, University of Cambridge.

Those who have gained some practical knowledge of the methods of production and manifestations of anaphylaxis realize what an important share this phenomenon is destined to play in discussions on certain pathological conditions, and in moulding opinions as to the nature of the processes involved in the cure of infective disease. Although this question has come to the front, especially in connexion with treatment consisting of the injection of single or repeated doses of antitoxic serums, this is by no means the most pressing of the questions associated with the anaphylactic condition. Indeed, we may take it that although phenomena closely allied to those produced by the true anaphylactic condition (supersensitiveness) are observed in serum treatment, this condition is merely a somewhat atypical example of supersensitiveness. As Dr. Dixon has pointed out, the anaphylactic reaction is the result of the introduction of small doses of a protein into the "exposed" tissue of a living animal organism. This primary injection, spoken of by the French school as the preparatory, or sensitizing, dose, if followed at an interval of from ten days to several weeks by a "stimulating" or "exciting" dose of an even smaller quantity of the same serum, gives rise to phenomena so marked that there is little difficulty in distinguishing the condition; moreover, the specificity of the process is such that several workers have claimed this anaphylactic process as being useful in the demonstration of the specific character of the blood derived from various animals, and have thus ascribed to it considerable value in forensic medical investigations. It is certainly interesting to note that by the application of the anaphylactic method, it is possible to obtain a specific reaction with quite as small quantities of blood as are necessary for the precipitin test; though I think it would appear that more blood is required for the carrying out of this test than for the deviation of complement test. Further experience and elaboration of the process, however, may enable the medical jurist to obtain still more delicate results.

The next condition which requires further elucidation is that associated with disorders such as nettle-rash in persons who are said to have definite "idiosyncrasies." Many different forms of food are *anathema* to certain individuals. I myself, for instance, have on several occasions after eating crab-pie or wild strawberries suffered more than intense discomfort from severe nettle-rash, with the result that, in self-defence, I now avoid both. Moreover, drugs such as salicylates, certain salts of quinine, iodoform, the bromide salts, and even the iodides, may sometimes prove themselves very objectionable through their sensitizing action.

In connexion with the absorption of foreign proteins from the alimentary tract, it is interesting to note that when albuminoids are introduced into the upper part of the tract, where they are submitted to prolonged and active chemical treatment, anaphylaxis is very rarely developed unless there be some lesion in the walls of the canal. When, however, the injection is made into the lower part of the tract—the large intestine, whence, as we know, absorption of material in a comparatively unaltered condition may take place—an anaphylactic condition may result. May this fact not give us some indication as to the lines to be adopted in using tuberculin? Intrarectal administration of tuberculin has, of course, been both recommended and tried; but the recorded results are at present too few and too inconclusive to allow of any very definite teaching being founded upon them. One scarcely associates the supersensitive condition with the ingestion of milk, though it is well known that certain individuals exhibit a great intolerance to this aliment. In the adult this intolerance has been attributed to imperfect digestion, especially when the milk is taken in bulk and coagulated in large masses, and is therefore carried in an undigested condition into the large intestine, where, as has been observed in certain experiments on guinea-pigs, a protein may first act as a preparatory injection, and at a later stage as a stimulating injection. In breast-fed children suffering from lesions of the alimentary tract (and sometimes when no definite lesions can be demonstrated) characteristic anaphylactic symptoms, even followed by death, have been recorded when the children were suddenly transferred to a diet of cow's milk—the homogeneous protein of the mother inducing no supersensitive condition, but the heterogeneous protein of the cow acting violently as soon as there has been time for the induction of the supersensitive condition.

It is evident that the diagnostic value of the anaphylactic condition depends very largely on the specificity of the protein. Jenner foreshadowed this in his extremely careful observations on the local supersensitive condition; this observation is alluded to by Hektoen[1] in an article on "Allergy or Anaphylaxis in Experimental Disease," from which I quote verbatim:

> In his *Inquiry into the Causes and Effects of Variolae Vaccinae, a Disease discovered in Some of the Western Counties of England, particularly Gloucestershire, and known by the Name of Cow-pox*, 1798, he (Jenner) records (page 13, Case 4) that a woman who had had cow-pox thirty-one years before was inoculated with variolous matter, and that "an efflorescence of a palish red colour soon appeared about the parts where the matter was inserted, and spread itself rather extensively, but died away in a few days without producing any variolous symptoms." In a footnote he comments on this phenomenon as follows: "It is remarkable that variolous matter, when the system is disposed to reject it, should excite inflammation on the part to which it is applied more speedily than when it produces the small-pox. Indeed, it becomes almost a criterion by which we can determine whether the infection has been received or not. It seems as if a change which endures through life had been produced in the action, or disposition to action, in the vessels of the skin; and it is remarkable, too, that whether this change has been effected by the small-pox or the cow-pox, the disposition to sudden cuticular inflammation is the same on the application of variolous matter." This remarkably clear statement probably records the first observation of allergy in an infectious disease.

This rapid manifestation of a local sensitiveness may be looked upon as the outcome of a general anaphylactic condition, and the early appearance of the local manifestation, as recognized by Jenner, affords a constant and characteristic diagnostic reaction, which we now know to be almost as characteristic and constant as is the Pirquet cutaneous diagnostic reaction obtained with tuberculin in cases of tuberculosis. In this connexion we should note a further remarkable manifestation in cases of haemorrhagic small-pox. Although vaccination appears to afford very complete protection where the dose of the small-pox virus is not excessive, it would seem that a vaccine virus exerts little or no protective influence against those "massive" doses that occasionally gain access to the individual. Haemorrhagic small-pox has been described, though comparatively rarely, in vaccinated individuals, and Hektoen notes that

> it has been suggested that haemorrhagic small-pox may be an expression of a specially intense reaction between antigen, the preparatory substance, and antibody, the substance produced.

Lytic changes are set up, not in the floating cells alone, but also in the epithelial cells of the capillaries; the result is severe damage to the walls of the capillaries, owing to the action of the lytic antibodies set free by the exciting virus.

An interesting example of the untoward results of the setting up of anaphylaxis is one that affords some explanation of a most mysterious condition associated with operations for the removal of hydatid cysts. There is, of course, but a small percentage of albumin in the fluid of a hydatid cyst—only some 0.5 per cent. It appears, however, that this albuminous fluid may, under certain conditions, act as a "preparatory substance," either through general absorption, or by some slight lesion; for in certain cases where, during operation, there has been an escape of the fluid from a hydatid cyst into the peritoneal cavity, and consequent rapid absorption, death with distinct anaphylactic symptoms has supervened. This phenomenon, of course, was inexplicable before the thread of events involved in anaphylaxis had been somewhat unravelled.

Experiments confirmatory of those carried out by Professor Chauffard may add no new crude facts to our knowledge of this special form of supersensitiveness; but work carried on with a less complex form of albumin than many of those hitherto experimented with may enable us to elucidate further secondary features, and to learn something more as to the specificity of the process.

It has been stated that the proteins of the placenta and even amniotic fluid may act as preparatory and exciting substances in the production of a hypersensitive condition in an individual of the same species as that from which placenta and fluid are taken; but it has never yet been proved that there is any specific poison contained in either of these substances. Wolff-Eisner[2] maintains that the alterations produced by the infection of these substances into animals have not been characteristic of eclampsia, though he agrees that the eclampsia, with its convulsions, nephritis, haemorrhages, etc., resembles closely the "complex" set up by the repeated reabsorption of heterogeneous albumin. He seems to think that the placenta partakes as much of the male element as of the female, and that to that extent the proteins are heterogeneous. We know that under normal conditions the placental villi are actually absorbed towards the end of the period of gestation, and it is quite possible that this process of absorption may be considerably accelerated under conditions in which there is some lesion of the uterine surface, and especially when there is breaking down of the villous tissue; and it is quite possible, and even probable, that the lytic processes that occur towards the end of the period of gestation may, under certain conditions, be greatly exaggerated, and thus give rise to the eclamptic or hypersensitive condition above referred to. Rosenau is distinctly of the opinion that the repeated absorption of villous elements plays this important part in eclampsia: and Wolff-Eisner[3] writes:

> We now know positively that the heterogeneous albumin from the syncytium finds its way into the circulation of the pregnant woman, and under certain conditions eclampsia ensues as the sign of the real absorption of the albumin and the resulting hypersensitiveness.

This author holds, indeed, that the eclamptic condition is only the severest of a group of phenomena, of which urticaria, albuminuria, and the vomiting of pregnancy are the commoner members, resulting from the absorption of heterogeneous albumin.

It is obvious that we can know little of the causes of this series of phenomena until we have a much wider knowledge of what takes place in the absorption of these heterogeneous albumins. Here is a very suggestive line of inquiry for us. Is not contraction of the uterus, even under normal conditions, in part, at any rate, brought about by sensitization of the muscle fibre by an anaphylactic process in which the intermittent absorption of the villous processes of the placenta or their proteins play a part? Gräfenberg,[4] quoted by Wolff-Eisner, states in this connexion that:

> In the first three months the placental villus shows heterolysis—that is, it acts digestively on the serum plate. The purpose of this process is perhaps to facilitate the embedding of the ovum. The fact that during pregnancy, probably as a reaction from the reabsorption of tryptic ferments from the chorion, the amount of antitrypsin in the maternal serum increases to double the normal content, is to be regarded as a sign of the reabsorption of parts of the chorion by the maternal organism.

Whatever we may think of the explanations given, the facts are of extreme interest in connexion with the production of the supersensitive condition in its relation to puerperal eclampsia.

It was in Arloing's laboratory that we first had observations leading up to the inference that in the tubercle bacillus are substances which, introduced into the animal body, diminish the resistance of the tissues, and render them more sensitive to a second infection; but it was left to Koch to describe in detail a series of changes which we now recognize as being associated with a condition of supersensitiveness to these products. He showed that when a normal or healthy guinea-pig receives an injection of the living tubercle bacillus into the subcutaneous tissue there appears to be a latent period, during which comparatively little change goes on at the site of the injection. After this, however, in from ten days to a fortnight, a firm nodule appears. The skin ulcerates, and the tuberculous process progresses until the animal succumbs, the ulcer remaining open until the last. When the guinea-pig has already been inoculated with the tubercle bacillus, and a tuberculous process set up, a secondary inoculation with the tubercle bacillus gives rise to much earlier, though not always more extensive, local changes. Swelling appears on the second or third day; in the centre of the swelling the tissues seem to die *en masse*, the skin ulcerates, and the necrosed mass is thrown off, after which healing of the ulcer may take place, and there is little or no extension of the tuberculous process beyond the point of introduction. In effect, there appears to be a local supersensitiveness, accompanied by a surrounding tissue immunity, which interferes with the extension of the tuberculous process. Tuberculin and dead tubercle bacilli respectively appear to cause corresponding reactions in the healthy and in the tuberculous guinea-pig; and there can be little doubt that this condition of anaphylaxis was associated, in Koch's mind, with the local protection against the invasion of the living tubercle bacillus.

Whilst, on the one hand, we must accept this evidence, it must also be noted, as pointed out by Austrian,[5] working at the Phipps Tuberculosis Dispensary in Baltimore, that the pounded bodies of washed tubercle bacilli give up to water a substance which may be precipitated by absolute alcohol. This substance—a protein—when injected into the peritoneal cavity of a guinea-pig or a rabbit, renders it supersensitive; but in the doses used (15 mg. for the guinea-pig and 50 mg. per kilogram weight of rabbit) it conferred absolutely no immunity against even small doses of tubercle bacilli. In fact, it appeared to render a certain proportion of the animals considerably more susceptible than were the unsensitized animals. So marked, indeed, was this in the rabbit that doses of human bacilli incapable of setting up tuberculosis in the normal rabbit induced a progressive tuberculosis which in some cases proved fatal—apparently bringing the human type of tubercle bacillus almost into line, as regards virulence, with the bovine.

The marked differences in the anaphylactic or supersensitive condition obtained when a heterogeneous protein is introduced into the alimentary canal, as compared with its tremendous sensitizing or anaphylactic power when introduced parenterally, has always attracted attention. Gastric and intestinal splitting up of the proteins certainly runs on different lines from the dissociation that goes on in the other tissues of the body. Moreover, the mucous membrane appears to limit very sharply the passage of any but digested albumin beyond the alimentary tract. In spite of this, a number of those interested in the treatment of tuberculosis have persisted—and not unnaturally, in view of the unfortunate consequences that have arisen as the result of the subcutaneous injection of "large" doses of tuberculin—in giving tuberculin by the mouth, and some appear to have convinced themselves that they have obtained satisfactory results. Under present conditions, I should be inclined to encourage this method of administration, if the substance is to be given indiscriminately by all and sundry, but I should encourage it because I should expect tuberculin so introduced to exert little, if any, profound or constant effect upon tuberculous tissues. Tuberculin, like any other protein-containing body, is digested in the alimentary canal, and not until this has taken place can it be passed on to the tissues. In the digestive tract it appears to be non-toxic, though when introduced parenterally it is so tremendously active. To those who have doubts on this point I would call attention to the results recorded by Dr. L. Cobbett and Dr. A. Stanley Griffith in their report on tuberculin to the Royal Commission on Tuberculosis. They found that large quantities of "old" tuberculin—in one instance as much as a pint—fed to thirteen tuberculous calves had not sufficient stimulating effect upon their tissues to give rise to a diagnostic tuberculin temperature reaction. In 10 of the 13 experiments, there was no rise of temperature at all, whilst in the other 3 there was a rise in one case of 0.2° C., in another of 0.4° C., and in a third of 0.7° C. Other kinds of tuberculin *may* act more energetically when given by this channel. According to Sahli, all tuberculins differ in degree and not in kind, and depend for their activity upon one set of substances—the proteins; but these experiments certainly afford little

promise that the administration of tuberculin by the mouth will help in treatment.

Richet[6] insists that up to the present we have obtained no evidence that tuberculin sensitizes to tuberculin, although the anaphylactic reaction of tuberculous subjects to tuberculin is so pronounced. Although in tuberculin what he calls the "exciting" or "stimulating" substance is present in large quantities, the "preparatory" substance is entirely absent. These observations may be set alongside similar observations made whilst he was studying the action of actino-congestines, the substance with which he first produced the anaphylactic condition. He found later that exciting substances could be dissociated from the preparatory substances, the latter, or a combination of the two, sensitizing the animal, the exciting substance inducing the anaphylactic phenomena. Again, he demonstrated that in an animal infected by the tubercle bacillus preparatory substances are present "which are not present in the tuberculin we use, either because they are not developed in the culture media with the same intensity and with the same ease as in the infected organs," or perhaps because precipitating by alcohol or heating to 200° may so alter the tuberculin that it loses its preparatory power whilst retaining its exciting power. In all probability the immunization set up by the use of small doses of tuberculin is associated with this preparatory process in the first instance, and although the stimulating or exciting process may be essential, a state of unstable equilibrium may be very easily induced during which reaction useless or harmful to the patient, rather than beneficent, may be set up. At present our knowledge of this process is comparatively sketchy. It is maintained by Yamanouchi,[7] Bauer,[8] Edward Lesne and Dreyfus, and Helmholz that a passive anaphylaxis to tuberculin may be transferred from guinea-pig to guinea-pig along with the serum of the prepared animal. The results obtained by these observers, however, are somewhat fragmentary, and Marelli and Josef, and Simon, repeating these or similar experiments, have been unable to corroborate their results. The question is so important, however, and has such a very grave bearing on the treatment of tuberculosis by tuberculin, in view of the many suggested methods of immunization, that more knowledge on this subject must be sought.

This anaphylactic condition promises, I am afraid, to be the *bête noire* of those who are investigating the serum and cell products of cancer. It is obvious that in an animal capable of being supersensitized the periodical injections of emulsions of cancer cells, of growing cells of cutaneous or mucous tissue or of serums from cancerous animals must involve great danger of producing an anaphylactic condition, and just before I came down to this meeting I was interested to receive a letter from Professor Grünbaum, of Leeds, who hoped that light might be thrown on this subject by some of those taking part in the discussion, as he has lost such a very large number of his experimental animals from a supersensitiveness so highly developed that it has become a difficult matter for him to carry on his experiments owing to the high death-rate amongst them. The occurrence of such a condition during the course of treatment must limit our field of operations as regards experiments on the cure of cancer, but, on the other hand, it opens up to us a line of research in connexion with the diagnosis of disease that affords distinct promise of a fruitful issue, and I have great confidence in recommending its study to those interested, especially in view of the fact that cases of sudden death from unexplained causes are of by no means rare occurrence in cancerous patients.

It is evident, from what has already been said, that in certain specific infective diseases sensitized animals may be killed by the rapid action of the very powers that help to immunize. Through the changes that are set up in the fluids and tissues the sensitized animal is in a position to disintegrate by some lytic process the proteins of specific bacteria. During the process of lysis the specific poison, whatever may be its character, is set free. This disintegration may take place so slowly that any poison elaborated may be summarily dealt with by the tissue cells and fluids, and the micro-organism associated with the disease is reduced to the position of a saprophyte and is rapidly killed off. If, however, the lytic power be too highly developed, so that when a large amount of vaccine—or, alternatively, too great an amount of infective virus—is introduced, such an enormous amount of poison may be set free that the very magnitude and perfection of the processes usually helping to protect the patient may result in such profound poisoning of important tissues and organs that the patient succumbs, although practically every micro-organism may have been destroyed.

Victor C. Vaughan,[9] writing on the relation of anaphylaxis to immunity and disease, gives an excellent example of the fact that "there is no constant and fixed relation between the toxogenic and the pathogenic properties of bacilli." The non-pathogenic *Bacillus prodigiosus* contains in its bacillary protein over fifty times as much intracellular poison as does the highly pathogenic anthrax bacillus, and he offers, as an explanation of the difference between the pathogenicity of the two organisms, the fact that the secretions of the *Bacillus prodigiosus* are incapable of digesting the proteins of the animal body, or perhaps—and he considers that this is the more probable and satisfactory explanation—the secretions of the body cells destroy the bacillus, and thus prevent the production of toxins by the bacillus. The anthrax bacillus, however, although it actually contains less poison in its protein, is able to resist the action of the body cells and to elaborate ferments which have the power of digesting the proteins of the animal body. The one micro-organism, *Bacillus prodigiosus*—a mere saprophyte, and unable to attack living tissues—is incapable of multiplying, whilst the other, the anthrax bacillus, able to digest the proteins of the animal body, obtaining from them its nutriment, can grow, multiply, and form toxic substances in large quantities. He offers this also as an explanation why "a given bacillus may be pathogenic to one species or one race, and wholly devoid of effect on other animals." It is this power of lysis apparently that plays perhaps the most important part of all in the production of the anaphylactic condition.

Sahli[10] maintains that the recurrent attacks of such conditions as articular rheumatism, pneumonia, and erysipelas are the result of acquired hypersensitiveness, and that this is accompanied by a degree of protection which renders the later attacks milder and of shorter duration than the initial attack. He puts the matter very clearly:

> By virtue of a previous recovery from these diseases the organism acquires a hypersensitiveness, and therefore, when again exposed to the infective agents, relapses more quickly and more frequently than the healthy organism. On the other hand, just because of this hypersensitiveness and the resulting production both of the non-specific inflammatory and the specific antibody, it recovers more quickly and more easily from the infection than the normal organism.

I know that some are not prepared to accept the suggestion that the crisis in pneumonia has anything to do with the anaphylactic condition, but Wolff-Eisner[11] points out that the bacteriolysins present in the body ensure a continuous liberation of endotoxins from the lysed pneumococci. As a result of the liberation of toxins and antigens a larger amount of lytic antibody is produced, and at a certain stage these ensure the disintegration of the whole of the pneumococci that have made their way into the tissues. The tremendous amount of toxin thus set free gives rise to the symptoms of crisis, but as soon as these toxins have done their work, there being no more pneumococci present, the condition of the patient improves rapidly—the crisis is passed. In certain cases, however, where the destruction of the pneumococci has not been complete, further lytic antibodies are formed under the action of the remaining antigens, the protein of the pneumococci, and a secondary or pseudo crisis may result. On this point a very suggestive and interesting note is added to his text by Wolff Eisner. He says:

> It would be wrong to assume that antibodies accumulate before they begin the attack. They begin the attack as soon as they are formed. The formation, however, is stimulated when, owing to the irritation of the endotoxins liberated by the bacteriolysins spontaneously present, they are cast off from the cells, particularly, it would seem, in the haematogenic organs.

Many individuals who are supposed to be exceedingly susceptible to colds and catarrh may be individuals highly supersensitized to some special substance; and one cannot help thinking that many of those who suffer from so-called nasal catarrh and coryza have been supersensitized, and kept in a highly sensitized condition during

certain periods of the year, by the waste proteins accumulating in rooms where there are large congregations of people, the stimulating or exciting dose of protein being applied at intervals. We know that the exhalations, or at any rate matter, conveyed from the horse may induce severe asthma in the human subject. That is now recognized as being an anaphylactic condition. May we not have a similar but modified series of phenomena resulting from the inhalation of the organic exhalations of crowds? Of course, it may be that a supersensitive condition is set up to the "lysed" micro-organisms, staphylococci, streptococci, etc., present in the mucous membrane—micro-organisms which under ordinary conditions kept outside the tissues, may on congested surfaces gain more ready access to the deeper naked tissues, and so set up a supersensitive condition. These are all points of interest.

Before I close, may I be allowed to introduce a side issue, but one that involves some of the most important practical outcomes of recent studies in anaphylaxis? it bears on the suggestion that in certain cases antidiphtheria and antitetanic serum should be prepared in goats and in oxen. Surely it is "practical politics" that all prophylactic doses, especially of antidiphtheria serum, should be taken from some animal other than the horse, so that should it be necessary at a later stage to inject large quantities of antiserum, say, in the treatment of cases of diphtheria, the patient would not be already sensitized to horse serum. May I suggest that those engaged in the preparation of antitoxic serums should keep a separate series for prophylactic treatment, and that these should always be obtained from the ox or the goat?

REFERENCES.

[1] *Journ. Amer. Med. Association*, 1912, vol. lviii, No. 15, p. 1087. [2] *Clinical Immunity and Sero-Diagnosis*. Translated by Ray. W. Matson, M.D., London, 1911, p. 64. [3] Loc. cit., p. 65. [4] *Muench. med. Woch.*, 1909, p. 702. [5] The Effect of Hypersensitiveness to a Tuberculoprotein upon Subsequent Infection with Bacillus Tuberculosis, *Bull. Johns Hopkins Hospital*, 1912, vol. xxv, pp. 11 et seq. [6] *Anaphylaxis*. Translated by Murray Bligh, M.D., Liverpool, 1913. [7] *Wien. klin. Woch.*, 1908, p. 1623. [8] *Muench. med. Woch.*, 1909, p. 1218. [9] *American Journal of Medical Sciences*, 1913, vol. cxlv, p. 162. [10] Loc. cit., p. 154. [11] Loc. cit., p. 72.

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ANAPHYLAXIS IN ITS BACTERIOLOGICAL ASPECTS.

BEFORE considering the special bacteriological aspects of anaphylaxis it is necessary to review briefly the nature of the reaction, and to eliminate other causes producing sudden death in animals.

I. THE NATURE OF THE ANAPHYLACTIC REACTION.

The first point to be discussed is the nature of the anaphylactic antibody. It is still considered by some observers that the antibody which produces anaphylaxis is a special one, and distinct from the amboceptors or precipitins, etc.

We have performed a series of experiments in which we have endeavoured to show that the anaphylactic antibody is identical with the amboceptor, and that, given a sufficient amount of amboceptor, anaphylaxis can always be produced. We inoculated intravenously a series of guinea-pigs of even weight with graded quantities of an anti-sheep haemolytic serum from a rabbit of high titre. After thus passively sensitizing the guinea-pigs they were injected intravenously with washed sheep's red corpuscles (twenty-four hours later). It was found that acute anaphylaxis could be always produced in animals which had been sensitized with a sufficient quantity of amboceptor, the quantity necessary for a guinea-pig of 250 to 300 grams being 1,680 units and above, a unit being that quantity of haemolytic serum which will, in the presence of complement, just produce complete haemolysis of 100 c.mm. of a 10 per cent. red corpuscle suspension. Below 1,680 units acute anaphylactic death never occurred, but only some of the minor manifestations. On the other hand, however much amboceptor is used anaphylaxis can always be produced if a sufficient quantity of antigen is subsequently inoculated intravenously. That is to say, that excess of antibody does not protect against anaphylaxis In the guinea-pig it is very difficult to produce immunity to a foreign protein by repeated inoculations in the ordinary way, the animals continually dying after the second or third injection. Further, if a highly immune animal be obtained, intravenous injection of a sufficient quantity of antigen always kills from acute anaphylaxis. For example, a guinea-pig of 300 grams was immunized to sheep's red cells and had a lytic titre as high as 4 c.mm., which represents over 56,000 units in the animal's body. The intravenous inoculation of 0.2 c.cm. of red cells caused acute anaphylactic death. There thus seems to be a direct parallel between the sensitizing power of an amboceptor containing serum and its amboceptor content. We can also say that in guinea-pigs an excessive amount of amboceptor does not protect against anaphylaxis. The above quantitative relationships also hold when the guinea-pigs are passively sensitized with homologous haemolytic serums.

II. THE ACTION OF THE ANTIBODY.

The question arises as to whether acute anaphylactic death in the guinea-pig is due to the action on the bronchial musculature of a toxic substance produced by the interaction of the antibody and the antigen, or whether it is caused by mechanical irritation produced by an alteration in surface tension due to beginning precipitation from the interaction of the antigen and antibody. With regard to the latter, Dale has suggested that the reaction in excised involuntary muscle of a sensitized animal is so rapid that it cannot be assumed to be due to ferment action, but is probably due to the irritation produced by a sudden alteration in surface tension from beginning precipitation. The points against this view are:

1. That removal of its whole protein content does not appreciably alter the surface tension of a fluid. The surface tension depends on the lower molecular bodies.
2. That when the homologous antigen is mixed with the sensitive serum the alteration in surface tension for the first two hours at room temperature is the same as when the antigen is added to normal serum. These observations on the surface tension were kindly performed for us by Dr. Lovell.
3. That substances such as bile salts, which produce a rapid alteration in surface tension, do not cause anaphylactic death.

Again, in some of our experiments egg-yolk was used as the sensitizing antigen, and on comparing the effect of the egg-yolk on sensitive and normal serums there was an alteration in surface tension, which was equally rapid in the two cases and equal in degree, and was wholly due to surface tension altering substances in the egg-yolk. Egg-yolk inoculated intravenously into a normal animal produces no obvious results, although it contains surface tension altering substances. Thus we should say that the anaphylactic reaction is not due to a sudden alteration in surface tension.

Now, with regard to the extreme rapidity of the reaction, this is used as an argument against it being due to toxic substances developed as the result of ferment action on the antigen. If this be so it equally holds against the idea that the condition is due to an alteration in surface tension produced by the interaction of the two substances. Time is also a factor here; time is also required for the combination of precipitin and precipitinogen. So if the one can produce instantaneous effects, why not the other?

III. DOES THE ANAPHYLACTIC ANTIBODY ACT AS A PROTEOLYTIC FERMENT?

The only real objection to the antibody being a ferment is the fact that it is supposed to act quantitatively, that is, that it cannot do an indefinite amount of work like an ordinary ferment, that it does not become free when the reaction is completed. That this is erroneous is shown in the following way:

If a complement fixation experiment be carried out in a test tube the complement once bound never becomes free again. If, however, the experiment be performed in a diffusion membrane through which protein cleavage bodies can pass against normal saline, the complement becomes free again after a few hours. This was demonstrated by taking out samples from time to time and adding to them haemolytic serum and red corpuscles. The samples were not in themselves directly haemolytic. The first samples were unable to activate a haemolytic system, but those removed some hours later were able to do so. The diffusate after

concentration was shown to contain protein cleavage bodies. This shows that complement which has once become bound can, if the products of its action are removed, become free again. That the antibody can also become free can be shown in the same experiment. If a sample be taken at the time when the complement is free again and fresh antigen be added to it, it will be seen that on further incubation in a test tube the complement now becomes fixed. Thus both complement and antibody must have become free, and can attack a further quantity of antigen.

Muir has also shown that if fully sensitized isogenous red corpuscles be inoculated into an animal, the amount of corpuscular destruction is by far greater than can be accounted for by the lysis of the inoculated sensitized corpuscles, showing that the lysin attached to the red cells has become free and has attacked fresh ones.

Further, it can be shown that complement does not act quantitatively except in minimal doses. Thus we have shown that if the unit of ambceptor be added to a unit of red cells a certain quantity of complement is necessary for the haemolysis. If, now, one hundred times the quantity of red cells and one hundred times the quantity of amboceptors be mixed together, to cause complete haemolysis one hundred times the amount of complement is not necessary; even as little as twenty-five times the quantity is sufficient—that is, one quarter of the calculated amount.

Thus we have shown that the antibodies fulfil some of the most important laws of ferment action. That the antibody has a proteolytic action is seen by the examination of the diffusate of its action on the homologous antigen.

The rapidity of the anaphylactic reaction remains to be discussed: (1) The amount of toxic substance necessary to produce acute death is exceedingly small, since acute anaphylactic death in a guinea-pig can be produced with the toxic substance obtained by the action of normal guinea-pig's serum from half a drop of horse serum. (2) The action of a ferment on a fermentable substance is at the commencement of the reaction infinitely rapid, as degradation substances accumulate the reaction is slowed.

Thus, in the animal body, the ferments acting under their optimum condition can very rapidly produce the necessary amount of toxic substance to cause death. In the sensitized involuntary muscle the ferment is bound to the muscle; there are no end bodies to slow ferment action, so that the ferment action will be infinitely rapid; the necessary small amount of toxic substances will be liberated in immediate contact with the muscle. It is thus unnecessary for there to be any appreciable latent period.

There still remains for discussion the action of colloidal substances when inoculated intravenously into guinea-pigs. The substance most frequently used in connexion with experiments of this description is colloidal silica. Kaolin and kieselguhr have also been injected intravenously and, like colloidal silica, produced rapid death, and this death has by all previous observers been thought to be identical with or very like acute anaphylactic death. This, however, is quite erroneous, since, on careful observation, it is seen that the real cause of death is intravenous clotting. After the injection of a few cubic centimetres of a suspension of colloidal silica the animal dies—convulsions are not a marked feature; on *post-mortem* examination, carried out immediately after death, it is seen that the blood in all the veins is clotted. The lungs may show a certain degree of distension, the distended lungs are very hyperaemic and somewhat oedematous, and there are in addition many areas of collapse. In the case of kaolin and kieselguhr the injection of a suspension in normal saline also produces similar sudden death. Here, also, there is rapid intravascular clotting and the lungs are only slightly distended. It will thus be seen that the mode of death is quite different from and is not comparable to the mode of death in acute anaphylaxis. It can thus be said that acute anaphylactic death, with its typical features, is only produced when the toxic substances are produced in the animal's body by the interaction of the antibody with its homologous antigen, or when this toxic substance is inoculated preformed into the animal.

In examining a large number of guinea-pigs, dying from various forms of bacterial toxaemia or septicaemia, it was noticed that the mode of death was identical in all cases. The animal was never febrile, the temperature fell to below 94° F., there was paresis of the posterior extremities, gradually extending to the anterior, ruffling of the coat, shivering and varying degrees of respiratory spasm. At the autopsy there was always right-sided congestion and venous engorgement. The lungs, in quite 90 per cent. of the cases, showed a fairly marked degree of emphysema, and the gall and urinary bladders were distended. This condition is exactly parallel, both in its symptoms and *post-mortem* appearances, to that seen in delayed anaphylaxis, and is comparable to what happens when a normal guinea-pig is inoculated intravenously with a sufficient amount of fully sensitized sheep's red corpuscles. Thus if a guinea-pig of 300 grams is inoculated intravenously with 5 c.cm. of a 10 per cent. suspension of fully sensitized sheep's red corpuscles, the animal dies in about eight to twelve hours, with symptoms exactly like those described above. The *post-mortem* findings are the same. Here the cause of death can only be due to toxic substances formed from the corpuscles by the action of the guinea-pig's complement on the sensitized red cells, the rate of liberation of toxic material being just rapid enough to produce delayed toxic death.

The next point for consideration is the result of the inoculation intravenously into healthy guinea-pigs of the serum, blood, and effusions of guinea-pigs or rabbits dying from bacterial toxaemia or septicaemia. In our first experiments the serum or effusion was filtered through a porcelain filter, but it was found that, although the material so treated produced intense toxic symptoms in the inoculated animal, acute death rarely occurred; whereas with the unfiltered material acute death did occur, so that it appeared that the toxic substance underwent some change as the result of this treatment, and in our further experiments this method was not adopted. With the unfiltered serum, or whipped blood, or citrated blood, or effusion, on inoculation intravenously into a healthy guinea-pig, acute anaphylactic death could always be produced if a sufficient quantity were inoculated, the quantity varying from 2 to 5 c.cm. of the material. The mode of death and the *post-mortem* appearances were absolutely typical. This result was obtained by inoculating the fluids from animals dying from infection with the bacillus of chicken cholera, *B. phlei*, *B. danysz*, *B. coli*, *B. tuberculosis*, *B. proteus vulgaris*, *B. hoffmanii*, *Staphylococcus aureus*, *B. prodigiosus*, etc. Sublethal quantities produced either a great fall of temperature or fever, according to the amount inoculated. It might of course be argued that the toxic substance was not preformed in the blood used for the inoculation, but produced by the ferments of the normal animal into which it was inoculated, either directly from the bacteria, or macerated bacterial protoplasm, or from the sensitized macerated bacterial protoplasm present in that blood. In order to eliminate this possibility of error, healthy animals were inoculated either with large quantities of finely disintegrated bacteria or with sensitized disintegrated bacteria, but with the only exception of the inoculation with tubercle bacillary emulsion, acute death never occurred. In the case of the tubercle bacillary emulsion it was demonstrated that hydrolytic cleavage bodies were present, and that if other bacteria were allowed to undergo autolytic degradation they also become directly toxic. Now, the blood and effusions of the animals examined were never allowed to stand for any length of time, so that degradation of the bacteria could not occur subsequent to the removal of the material from the infected animal. It therefore follows that the toxic substance in these fluids was preformed, and was not formed subsequent to removal from the animal infected, either by autolytic degradation of the bacteria present or by the subsequent action on them of the antibodies of the normal animal inoculated. We must come to the conclusion that there is in the blood and effusions of animals dying from bacterial toxaemia or septicaemia a substance which is present in sufficient quantity to cause acute anaphylactic death when inoculated into healthy animals, and that this substance is always present, no matter what the organism is which has given rise to the infection. By diffusing the effusions of animals dying from bacterial toxaemia or septicaemia, hydrolytic cleavage bodies can be demonstrated in the diffusate, so

that the toxic substance is produced from the bacteria during the process of hydrolytic cleavage of the protein by the ferments in the animal body.

From these results it will be seen that guinea-pigs dying from bacterial toxaemia or septicaemia all die in exactly the same way. The *post-mortem* findings are identical and the toxic substance found in the blood is identical, and this toxic substance is present in relatively large amounts, as can be easily seen when it is considered that a few cubic centimetres of blood or effusion are sufficient to kill a perfectly normal guinea-pig. Such being the case, it appears to be superfluous to suppose that there is, in addition to this, a special toxic substance, characteristic of the bacterium—namely, a specific endotoxin. No matter how large a quantity of finely divided bacterial protoplasm is inoculated into a normal animal, acute death can very rarely be produced, and when it does occur it always has the character of acute anaphylactic death and is then probably due to the autolytic degradation bodies present. In all other cases, no matter what the bacterium is, death occurs in exactly the same way. The animal develops fall of temperature, ruffling of the coat, rigors, paresis, urination, and the *post-mortem* appearances are always the same, the only exceptions being that suprarenal haemorrhages or intestinal hyperaemia may be marked features. These, however, are by no means constant for special bacteria, but are frequently noticed with very widely different varieties of bacteria.

This leads, then, to the conclusion that bacteria have no specific toxic substance, and that the bacterial protoplasm is primarily non-toxic, and only becomes toxic when it has been acted upon by the antibodies present in the infected animal, and the degree of toxicity of a bacterium depends upon the rate of accumulation of these toxic degradation bodies, and this will depend upon the relation between the activity of the antibody present in the animal at the time and the quantity of bacterial protoplasm present—that is, upon the primary dose inoculated and the rate of multiplication of the bacteria. Two examples may be given supporting this view on the above idea. Animals are immune to certain bacteria either because the antibody activity of the animal against the bacteria is so high that the bacteria are rapidly degraded beyond the toxic stages, or because the antibody activity is so low that the toxic substances do not accumulate to any degree.

Now, dealing with an example of the latter—there is the *B. mycoides*—this is an organism which naturally occurs in the soil, and will not grow at body temperature. By a process of gradually educating it to an increasingly higher temperature it is possible to obtain a strain from the original which will grow at the body temperature. This organism is not pathogenic to guinea-pigs in doses of three agar slopes and more. If, however, a guinea-pig be inoculated with 20 mg. of dead *mycoides* a week previously, one agar slope of the organism will now in that animal produce septicaemia, and the blood and effusions of the infected animal will give rise to acute anaphylactic death when injected intravenously into a normal animal. There is no difference in the bacteria inoculated; the difference is in the animals. In the normal animal even 20 mg. only produce a transient temperature variation.

The possibilities are:

1. That the animal is immune because there is so little antibody that the toxic substances can only be formed slowly—so slowly that they do not accumulate in sufficient amount to injure the animal; but that after the injection of the preliminary dose the ferment activity is raised so that the ferments are now in such amount that sufficient toxic substances can be formed to kill the animal. That in one week antibody formation can be great enough is seen from the injection of 20 mg. dry weight of red corpuscles, when the lytic titre of the serum to the homologous antigen becomes such that a unit is contained in about 40 c.mm. of the serum.
2. That a negative phase is produced so that the toxic material of the second dose cannot be dealt with.

Dealing with the latter first, the following experiment negatives the idea of the result being due to the production of a negative phase. During our experiments on the *B. mycoides* several strains of closely allied and similar organisms were isolated from various soils. These grew easily at the body temperature. They were found to be directly pathogenic to guinea-pigs in doses of half an agar slope and less. Guinea-pigs were also inoculated with 20 mg. dry weight of these bacteria, and after intervals of respectively two, three, four, and five days, they were reinoculated with a dose certainly fatal to a normal animal—namely, half an agar slope, which usually produced death in less than eight hours—the animals all recovered, and even from larger doses. So that if in the one case the septicaemia and toxaemia are due to a negative phase, in the other a similar negative phase protects the animal. Experiments with other organisms bring out the same fact.

A possible third theory would be the state of anti-anaphylaxis—that is, that the 20 mg. of the first inoculation bound all the antibodies, and so allowed the second dose to be unattacked, to multiply, and so produce death. This is really the previous idea over again in other words. The only possible conclusion is that the whole matter rests on relative ferment activity. In the case of *B. mycoides* there is very little antibody activity, consequently toxic substances cannot be split off from the bacteria in sufficient amount to do damage and inhibit phagocytosis; with the other closely allied strains the antibody activity is just great enough to allow of a sufficient accumulation of toxic material so as to inhibit phagocytosis, allow the bacteria to multiply and cause death.

With the former a previous inoculation of dead bacteria causes an increase in the antibody activity, and at a certain period it is sufficiently great to bring about the conditions necessary for the death of the animal and the causation of septicaemia. With the others the antibody activity increases so that the toxic substances first formed are rapidly rendered non-toxic by the further rapid action of the antibody, so that the animal can now recover from what, under ordinary conditions, would have been a fatal dose. Then there are animals, which are immune because of the great antibody activity against certain bacteria. By diminishing the activity of the antibody against these bacteria a fatal result can always be produced. Here the immunity is due to the fact that the antibodies can so rapidly deal with the bacteria that the early-formed toxic substances do not accumulate, but are rapidly further converted into non-toxic ones.

Thus the toxicity of a bacterium depends on the animal—that is, on the relative antibody activity to the bacterium and not on the bacterium *per se*; the same bacterium producing different results according to the antibody activity in the different animals. The bacterium does not secrete a toxin or have a preformed toxin; the toxin is produced by the antibodies from the bacterial protoplasm, and is the same for all bacteria—that is, a toxic hydrolytic cleavage body of the bacterial protoplasm, producing death in the same way in all bacterial infections, and present in the infected dying animal in large amounts, so that a small amount of that animal's blood can produce in a healthy animal acute anaphylactic death. Hence we must not regard this state of so-called anaphylaxis or hypersensitiveness as a freak state nothing to do with immunity proper, but as a state that can always be made to occur and is relative, depending on the power of the antibody and amount of bacterial protoplasm present; according to the relations between them, acute toxic deaths, delayed toxic death or recovery may occur, the toxicity of a bacterium depending upon these factors.

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CLINICAL ASPECTS OF ANAPHYLAXIS.

I have been asked to say a few words on the clinical aspect of this subject, and I do not think I can introduce what I have to say better than by relating the histories of two cases. The illness in each case was due to a certain cause, but for the present I shall not say what it was. The first case was published by Dr. Blain.[1] The patient was a woman, aged 24. On January 24th, 1907, at 6 p.m. a certain event happened to her.

> Within twenty minutes . . . a profuse urticaria appeared over the entire body. The oedema of the periorbital tissue completely closed the eyes. The patient was greatly prostrated, respiration sighing, absence of radial pulse, complained of feeling faint and chilly, also of fullness in the throat. The bowels moved freely at 8.45 p.m., the patient complaining of

cramps in the bowels and soreness in the stomach. At 9 p.m. the radial pulse became perceptible, but was thready and intermittent; 10.30 p.m., pulse low in tension and irregular; 11 p.m., pulse somewhat improved, respiration still sighing, patient very restless; 12 midnight, bowels again moved freely. . . . After a restless night, at 7 a.m., the pulse was 88; the patient coughing a good deal from bronchial irritation; at 6 o'clock was able to retain a small amount of nourishment. Temperature rose to 100° F. at the beginning of the attack, but otherwise did not go above 99°. After a few days in bed the patient gradually recovered.

The second case was related by Dr. Atkinson.[2] The patient was a married woman, aged 40, who had always enjoyed good health except for periodical attacks of migraine. At about 7.45 a.m. on September 9th, 1907, a certain event happened to her.

> Within five minutes she began to itch all over, and felt herself swelling from head to foot. This was followed by abdominal pain and a desire to defaecate. . . . She then collapsed, and her husband and a maid carried her . . . to bed. She was then unconscious. I (Dr. Atkinson) arrived about 9 a.m. . . . I found her in a semiconscious condition, and the whole body irregularly convulsed. She rallied when spoken to, and then relapsed into apparent unconsciousness again. . . . The whole of her body was covered with a dark, measly rash. . . . The skin felt hard and tense and brawny. The hands, and especially the finger tips, were livid. The face was congested and the eyes suffused. She tells me there was a feeling of nausea all the time. The skin was cold, the pulse was feeble, and the heart sounds faint. A distinct wheeze could be heard over the chest. . . . At 10 a.m. she felt better, but complained of the tight feeling all over the skin and the difficulty of breathing. At 2 p.m. the rash had almost gone. She felt much better, but there was still some dyspnoea and feeling of constriction. . . . At 9 p.m. I found her very hot and flushed, and the skin now covered again from head to foot with a very bright scarlatiniform rash, and on the back and hips were many extensive wheals. On the morning of September 10th all rash had practically gone, but there was some oedema of both eyelids. All the other symptoms had disappeared.

There are several points of similarity between these two cases. It is true that the latter was more severe than the former, but it is to be observed that in each case the onset of the illness arose very quickly after the event which was believed to have occasioned the attack; that there was a rash, urticarial or erythematous; that there was enfeeblement of the heart's action; that there was some respiratory embarrassment; and that there was some gastro-intestinal disturbance. The first of these two cases was undoubtedly an example of anaphylaxis. The attack came on after a subcutaneous injection of diphtheria antitoxic serum in a patient who had been treated with serum about a year previously. In the other case the symptoms came on almost immediately after the sting of a wasp on the left foot.

Hitherto anaphylaxis in the human subject has been observed chiefly in connexion with antitoxic and antibacterial serum in diphtheria and other diseases. The serum almost invariably employed has been that of the horse. Now in the vast majority of cases an injection of horse serum is perfectly harmless at the time it is given. No symptoms arise then; but in about one-third of the cases treated with serum, after an interval or latent period of a week to a fortnight, the patient undergoes an attack of what is now known as serum sickness, of which the most common symptoms are an urticarial or erythematous rash, pyrexia, and in a few cases slight multiple arthritis. But serum sickness is not anaphylaxis, nor can it be taken as evidence that the affected person is necessarily in the anaphylactic condition. In order to demonstrate the existence of this condition, it is necessary to give another injection of horse serum, and this fresh injection must not be given before the end of the average latent period of serum sickness—that is, before the lapse of nine or ten days from the first injection. If the first injection has rendered the person anaphylactic, this second injection, given after the latent period, may be anything but harmless. An attack such as that which occurred in the first of the two cases related above, or even a more severe one, may follow either within a few minutes or hours, or, at any rate, well within the ordinary latent period. The latent period is, in fact, much curtailed. The primary injection has rendered the person much more sensitive to the action of the serum. Other evidence of over-sensitiveness is to be found in the occurrence, in unusual severity, of the symptoms of ordinary serum sickness (a rash and pyrexia), and also in the additional occurrence of symptoms which are not met with in ordinary serum sickness (cardiac depression, respiratory embarrassment, rigors, convulsions, coma).

The anaphylaxis which is brought about by an injection of horse serum is an acquired one, which it takes ten days or a fortnight to produce. But some persons are apparently naturally anaphylactic, for the symptoms of anaphylaxis may be evoked in them by the first injection of serum. This form of supersensitiveness may be called congenital, and, curiously enough, it is in this form of the condition that the most severe examples have been met with. Nearly all the fatal cases have belonged to this variety. There is also evidence to suggest, if not actually to prove, that many asthmatics are by nature in an anaphylactic state as regards horse serum.

I need hardly do more than point out that horse serum anaphylaxis is but one instance of the anaphylaxis which can be produced in animals by any protein. But in looking for instances of anaphylaxis in clinical medicine we must remember three important facts which have emerged from the experience of the laboratory. The first is that the protein must be foreign to the animal; the second is that to bring out the symptoms of an acquired anaphylaxis it is necessary to employ for the reacting dose the same protein as was used to establish the anaphylaxis; the third, and most important from the clinical standpoint, is that, whatever the protein, the anaphylactic symptoms are the same in the same species of animal.

If, therefore, we wish to find anaphylactic diseases in the human being, we must look for the symptoms of serum anaphylaxis. I have given one example in the case of wasp sting reported by Dr. Atkinson. The doctor, at the end of his report on the case, asks the question, "Is it possible that all this trouble could arise from the sting of a wasp?" To which I should have no hesitation in replying, "Certainly it is possible." One of the remarkable facts about anaphylaxis is that a very minute quantity of protein will suffice for the reacting and a by no means large one for the sensitizing dose. Amongst the agents that will produce in man symptoms which are extremely like those of serum anaphylaxis, certain articles of diet and certain insects pre-eminently figure. The ingestion of the one and the stings or bites of the other are the methods by which the reacting dose of the protein is introduced to the system. Certain fish, especially shellfish (mussels, crabs), a few fruits (strawberries, raspberries), and the stings or bites of some insects (bugs, wasps), are well known to be capable of evoking the anaphylactic syndrome. But while I have little, if any, hesitation in ascribing the symptoms set up by these agents to the anaphylactic state, I am not so sure that we know of any other agents which act similarly. From time to time cases are met with, I have seen them very occasionally in the course of some of the acute infectious diseases, which suggest anaphylaxis. But when we search for the cause which has produced and elicited the supersensitiveness, we have to confess ourselves baffled. I refer especially to odd febrile attacks with rashes of the same kind as those seen in serum sickness.

The general reaction set up by tuberculin would appear to be of an anaphylactic nature; but it is extremely doubtful when Wolff-Eisner's, Calmette's, and von Pirquet's local reactions are. Arthus's local anaphylactic reaction—as seen in rabbits—is never, or at any rate extremely rarely, produced by horse serum in man.

During the last two or three years more than one writer, clinical as well as bacteriological, has suggested, nay, has even boldly asserted, that several morbid conditions besides those I have mentioned should be included in the anaphylactic group; for example, puerperal eclampsia, the shock produced by burns and scalds, the idiosyncrasy to certain drugs, such as quinine, the rashes of some of the acute infectious diseases, specially of those of which the incubation period is seven to fourteen days. To me, however, the evidence brought forward in support of these suggestions is far from being convincing. From the clinical and from the experimental evidence I hold that inasmuch as anaphylactic symptoms are of the same kind whatever may be the protein concerned, when anaphylaxis is made manifest, it will be revealed by much the same symptoms as are seen in horse-serum anaphylaxis.

In respect of that form of anaphylaxis in man which is best known—namely, horse-serum anaphylaxis—there are

several points concerning which further clinical observations are required. I have mentioned above that apparently some persons are naturally oversensitive to the serum. But I think it is quite a question whether there really is a congenital anaphylaxis. May not those persons who react so strongly to a first dose of serum have been sensitized before? Some of the asthmatics have been peculiarly sensitive to the emanations from the horse. Possibly in them the anaphylaxis has been induced in this way. So also one may argue in the case of shellfish and insect anaphylaxis. The lady who suffered so severely from the effects of the sting of a wasp had been stung more than once previously by those insects, and she may have been sensitized by one of the earlier stings. Another question which awaits an answer is: How long will a person who has been rendered anaphylactic remain in that condition? The longest period I have known has been just over seven years. Not every person who is treated with serum becomes anaphylactic. I have had under my observation during the sixteen years ending December 31st last 203 persons who have been injected with serum twice at intervals varying from a fortnight to upwards of thirteen years, and 114 of them, or 56 per cent., were anaphylactic. There are a few cases on record which go to show that a person may not be sensitized by the first, but may be by the second, injection. In the first of the two cases I related at the beginning of my remarks the young woman had been treated with serum three times, the second occasion was six weeks after the first, and then no anaphylactic symptoms appeared. The third time was a year after the second, and then there was a most serious attack. Another question which arises is whether the anaphylactic condition varies in its intensity from time to time in any sensitized person. It has been stated by more than one observer that there is an optimum period for anaphylaxis in persons who have been treated with horse serum. Thus Gruzez and Bernard have concluded from certain experiments that in man there is little development of the condition within five weeks of the injection, that the symptoms are most likely to be brought out from the fifth to the twenty-seventh week, and that between the twenty-eighth and the forty-ninth week the supersensitiveness disappears. But these conclusions are not in agreement with what I have noticed in my cases. Of 45 patients reinjected within five weeks 17, or 37.7 per cent., were anaphylactic; and of 26 injected later than the twenty-seventh week 19 were so, or 73 per cent. Twenty-one were injected after the forty-ninth week, and of these 17, or 80.9 per cent., gave signs of anaphylaxis. My cases, therefore, afford no evidence of the existence of an optimum period, nor of the disappearance of the increased sensibility after a particular length of time. Another question which requires working out is whether the anaphylactic state, acquired or congenital, can be transmitted to the children of the affected person. It has been shown that the condition can be transmitted by the female guinea-pig, but not by the male, to its offspring. But I have not yet had occasion to inject with serum the child of any woman who had been injected before the child's birth. In the ordinary course of events there should be some, if only a few, such cases in the not very distant future.

Lastly, can the anaphylactic state be avoided or abolished? Certain experiments on animals go to show that it can be, at any rate for a time. Some of the methods used are quite inapplicable to the human subject, and the results of those which might be used are very uncertain. It is stated that if you inject a person, who may have been rendered anaphylactic by a previous injection, with a very small quantity of serum no general reaction will take place; and, further, that this small dose abolishes anaphylaxis for a time at any rate, so that a large dose may be injected with impunity within a few hours or perhaps a day or two. More especially is this the case if the small injection has evoked no local reaction. I have not had an opportunity of trying this method.

It has been stated that if an animal survives one anaphylactic storm it will not experience another—that it is, as it were, immunized against anaphylaxis. This is certainly not invariably the case in human beings. I have twice known anaphylactic symptoms to arise in patients after a third injection of serum, in whom the second injection had aroused those symptoms; and one of the cases I related at the beginning of my remarks shows that a person may be anaphylactic to a third injection who was not so to the second. It has been stated that if you give a second injection within a fortnight of the first—that is, within the latent period of ordinary serum sickness—you will protect the person so treated from anaphylaxis should a third injection have to be given subsequently. But I have had more than one case under my observation which has shown that that statement is not correct.

Fortunately, severe anaphylactic symptoms are not common in reinjected persons. But I should be very chary of giving serum to a patient whom I knew to be asthmatic. I should not give it unless he was suffering from a dangerous attack of the disease for which the serum was indicated. The suggestion that for a second injection the serum of a different animal from that whose serum was used for the first injection should be employed, is certainly to the point and quite worth a trial. I understand that such serums can be obtained. But more clinical evidence is required before we shall be able to speak with any certainty on this part of the subject, and the scantiness of the evidence must be my excuse for having so little that is of value to say about it.

It is a curious circumstance, for which I can offer no valid explanation, that while I still continue to witness undoubted anaphylactic reactions in persons reinjected with horse serum, yet these reactions are not so severe as those I saw when I first became acquainted with this phenomenon some sixteen years ago. This serum, made for the Metropolitan Asylums Board by Dr. Cartwright Wood, is less noxious than it used to be—a fact which is shown by the lessened severity not only of the anaphylactic but also of the ordinary serum reactions.

REFERENCES.
Medical Record, June 6th, 1908. [2] *Lancet*, October 25th, 1907.

THE ACTION OF THE ASBESTOS MINERALS AND ALLIED MATERIALS ON BACTERIAL AND OTHER SUBSTANCES.*

By Myer Coplans, M.D.
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This series of experiments arose out of an attempt to isolate the toxin of tetanus from a bacilli-free broth culture of *B. tetani* by gravity filtration through a recently prepared hydrate of alumina formed as a filtering layer upon filter paper.

As a preliminary it is necessary to wash the hydrate free from admixed electrolyte by means of a gentle and continuous stream of distilled water through the undisturbed layer of the hydrate; and, after six hours of such treatment, the filtrate contains greatly diminished yet appreciable quantities of the electrolyte in solution. About this period, however, the constantly shrinking gelatinous hydrate commences to show deep fissures, and the process is rendered abortive.

To overcome the difficulty finely carded Tyrolese asbestos was incorporated with the hydrate, and after prolonged washing the toxin-containing broth was allowed to percolate the prepared compound layer of hydrate and fibre. The filtrate proved to be toxin-free, and on treatment with alcohol the compound of hydrate and fibre yielded a considerable proportion of the tetanus toxin.

As a control test a sample of the toxin-containing broth was shaken with the asbestos fibre without the intervention of hydrate of alumina, and, after an interval of five minutes, the expressed liquid was found to be toxin-free. It failed, in addition, to give a positive biuret reaction, in strong contrast to that yielded by the untreated broth.

The investigation of this phenomenon has been extended so as to compare the activities of various kinds of finely divided "asbestos" minerals, including the Russian, Italian, and blue varieties of asbestos, chrysotile-asbestos of Canada, and, in addition, the steatites, as exhibited towards toxins (including those derived from *B. diphtheriae*, *B. tetani*, *B. tuberculosis* and *B. mallei*), certain antitoxic

* A portion of the expenditure in connexion with this research has been met by a grant from the Science Committee of the British Medical Association.

serums, cobra venom, complement and amboceptor of a haemolytic system, specific agglutinins, certain proteins, pigments and colloids, while as a convenient example of a ferment diastase was included, and submitted to similar tests.

All these substances apparently readily disappear from watery solutions, or are rapidly changed in character when brought into intimate contact with finely divided minerals of the asbestos group, while watery agar, watery gelatine, and watery isinglass, after similar treatment lose the power of setting.

The action of finely powdered and fibrous substances such as kaolinite, spun glass, the vegetable fibres (jute, flax, cotton and ramie), silk and wool, and, in addition, animal charcoal, have been under investigation in a parallel series of experiments. As an outcome of the results following the interaction between certain radio-active substances in solution and members of the asbestos group of minerals, the investigation is being extended to include the felspathic and plagioclasic granites, which, on weathering, give rise to complex hydrated silicates known as zeolites.

Arising out of the action on toxins in particular by members of the asbestos group, I have carried out a series of observations on the effect of introducing asbestos fibre into fluid nutrient media inoculated with various pathogenic organisms.

Experiments relating to the phenomena of super-sensitiveness have been carried out. In no instance, up to the present, have toxic properties been conferred upon a normal serum by means of treatment with asbestos.

Certain Chemical and Physical Characters.

Many substances are classified as belonging to the group of "asbestos" minerals, and their chemical and mineralogical properties are shown in the subjoined table. With regard to the fibrous varieties, the fibres vary greatly in diameter and length. Their thickness depends upon the degree of mechanical disruption to which they have been subjected. Some of the finest fibres are but 0.6 μ in diameter (33,000 to the inch) in the carded Canadian varieties, while with others the thickness varies from 1.0 μ (20,000 to the inch) and upwards.

CHEMICAL RELATIONSHIPS OF "ASBESTOS" MINERALS.

"Asbestos" may be divided into the following three groups:

1. *Anthrophyllite Group* [(Mg Fe)O Si O_2].
2. *Amphibole or Hornblende* [RO.Si O_2), where RO may represent CaO; NgO; FeO, etc.
   - (*a*) Tremolite [(3MgO.CaO.2SiO_2)].
   - (*b*) Actinolite [3(MgFe)O.CaO.2SiO_2].
   - (*c*) Hornblende asbestos, hydrated (Italian asbestos).
   - (*d*) Mountain leather, mountain wood, mountain cork.
   - (*e*) Crocidolite (Blue or African, West Griqualand) [NaFe (SiO_3)3. Fe Si O_3].
3. *The Serpentine Group* (3MgO.2 SiO_2. 2H_2O).
   - (*a*) Picrolite (Canada).
   - (*b*) Chrysotile-asbestos (Canada-Quebec).
   - (*c*) Talc.

N.B.—*Kaolinite* = (Al_2O3.2 SiO_2.2H_2O).

Proximate Composition of "Asbestos" Minerals (Dana).

	Tremolite.	Actinolite.	Crocidolite.	Chrysotile.	Talc.	Picrolite.
SiO_2 ...	57.7	61.82	49 6	40.87	59 59	37.88
Al_2O_3 ...	—	1.12	—	0.9	1.76	1.10
FeO ...	—	6.55	19.8	2.81	0.79	0.36
Fe_2O_3 ...	—	—	22.0		—	2.7
MgO ...	28.9	25.98	—	41.5	32.92	43.29
CaO ...	13.4	1.63	—	—	0.59	0.82
Na_2O ...	—	—	8.6	—	0.56	—
H_2O ...	—	5.45	—	13.55	3.79	14 52

Fibrous varieties of asbestos differ materially in their behaviour towards atmospheric moisture, as is testified by the following table:

D

Humidity Tests for Relative Absorption, as Compared with Condition at 103° C.

Process.	Temp	Time.	Change, Per Cent	Chrysotile.		Crocidolite (African).
				Canadian.	Russian.	
	°C.	hrs.				
1. Drying ...	120	3	Loss	0.49	0.48	0 19
2. Exposure to saturated atmosphere*	40	3	Gain	17.13	28.86	12 12
3. Drying ..	40	3	Water retained	0.33	0.34	Nil.
4. Exposure to saturated atmosphere†	13	12	Water absorbed	2.47	19 23	0.24

* Moisture = 50 grains per cubic metre.
† Moisture = 10 grains per cubic metre.

General Method.

1. For effect of treatment of liquids asbestos fibre equal to half the weight of the liquid has been added. The result is a moistened ball of asbestos which must be pressed to obtain any exudate.

2. For the effect on growth of pathogenic organisms in nutrient media 7½ per cent. by weight of finely-carded asbestos fibre has been added.

3. The fibre as a preliminary is dried at a temperature of 120° C., and must be kept in a moisture-free vessel. In the case of treatment with diastase the fibre was subjected as a preliminary to firing at a cherry-red heat. Heating above 120° C. degrades the mineral and alters its physical qualities, the fibres tending to disintegrate, while crocidolite is ruined for all test work if the temperature be raised to red heat.

4. When powdered mineral substances have been added to liquids the vessels have been placed in suitable rocking apparatus.

With regard to the method of preparation, I have come to the conclusion that it is better to use the finest carded varieties available, free of all coarse impurities, and that no further treatment is necessary. On the contrary, additional treatment, whether it be the process of firing or simple boiling with distilled water, causes degradation of the fibre both physically and chemically. Indeed, simple friction between the palms of both hands will reduce fine fibre to powder.

The action of distilled water on the asbestos minerals, on kaolin, and on animal charcoal, is of importance. Asbestos fibre is said to be "practically insoluble," or rather unacted upon by water. This is untrue, for in the early stages of this investigation prolonged experimental tests, some of them extending to four months, were made especially to prepare a purified form of asbestos fibre by means of the process of boiling in distilled water, or in dilute mineral acids followed by distilled water. By using electro-conductivity tests with direct reading apparatus, it is easily shown that asbestos is constantly acted upon and degraded by distilled water alone. In short there appears to be no useful purpose served by any attempt at purification by such methods.

The following table shows the results of such tests with distilled water, and for the purpose of comparison, animal charcoal and glass wool have been similarly treated. (The

Expressed Liquid under Test derived from	Conductivity of Expressed Liquid after			
	24 hrs.	42 hrs.	90 hrs.	280 hrs.
Control: Distilled water	3.2	3.2	3.2	3.2
Distilled water + Russian asbestos ...	321.28	551	756	1,472
Distilled water + Canadian asbestos...	1,152	1,696	2,204	2,272
Distilled water + African asbestos ...	448	630	702	1,056
Distilled water + Tyrol asbestos ...	988	1,152		
Distilled water + Austrian talc ...	102.4	121	130	186
Distilled water + animal charcoal ...	800.0	836.0	930	960
Distilled water + glass wool	2,560	2,793	3,444	4,216

units of conductance throughout are in terms of reciprocal megohms, cm^{-1}, at 20° C.) In each case to the distilled water there is added 50 per cent. by weight of the material, the degradation (or solution) of which is under test.

The constant and increasing degradation of all these substances in the presence of distilled water assumes importance if their rate of degradation or solution is materially altered—either hastened, stayed, or diminished—by the presence of substances in the liquid which apparently are inert. For instance, peptone water—0.2 per cent. solution of Witte's peptone in distilled water—when brought into contact with any of the foregoing varieties of fibrous asbestos, rapidly loses all trace of the proteose and peptone originally present. The conductivity of the expressed liquid, however, rises in an extraordinary manner, as shown in the following table:

Liquid.	Conductivity of Liquid (after 24 hrs.).	Biuret Test for Purpose of Comparison.
Distilled water...	3.2	0
Distilled water +0.2 % Witte's peptone	102.4	100
Distilled water +50 % Russian asbestos	321.28	0
Distilled water +0.2 % Witte's peptone +50 % Russian asbestos	620.8	0

Here the phenomenon of the disappearance of the diffusible proteoses and peptone from the solution is accompanied by an increased rate of degradation of the mineral substance, which ultimately is evidenced in the solution in the form of electrolyte.

In the case of non-diffusible colloids, such as suspensions of dialysed iron and methylene blue, the colouring matter of the suspension is quickly yielded to the asbestos fibre, the exudate becomes colourless, and its conductivity is markedly diminished. In short, the disappearance of the non-diffusible colloid, and the staining of the asbestos fibres, is accompanied by a deviation of electrolyte originally present in the solution.

In the case of colloidal gold in water there is in the presence of asbestos fibre immediate deposition of the gold on the fibre, giving rise to a stain which varies in intensity from puce to crimson. The conductivity of the liquid is that obtained from a simple experiment using asbestos fibre steeped in plain distilled water.

The results yielded by animal charcoal, when used in place of asbestos, are somewhat comparable. Both with animal charcoal and asbestos fibre the subsequent history of the liquids under test appears to be that the rate of disintegration in every case with non-diffusible colloids is somewhat lessened, due possibly to the formation of a protective coating around the particles either of the animal charcoal or asbestos fibre used. In addition the action of finely divided asbestos fibre on the following substances may be briefly mentioned:

Blood.—5 per cent. serum in normal saline yields negative tests for protein after two hours' contact. 1 per cent. haemoglobin in normal saline: colouring matter rapidly disappears.

Haemolytic System.—In the course of twelve hours' contact complement wholly disappears, and over 50 per cent. of the haemolytic amboceptor.

Agglutinin.—Serum diluted in normal saline 1 in 25: agglutinin (typhoid) entirely disappears in two hours.

Cobra Venom.—A solution made up so that 0.1 c.cm. contains a lethal dose for a large rat, the solution giving a well-marked biuret reaction, after twelve hours' contact yields a non-toxic liquid, and, in addition, the biuret reaction is entirely negative.

Diastase.—After four days' contact the expressed liquid shows no signs of the presence of the ferment when suitably tested with starch.

Boiled Starch (0.5 per cent. in water).—After four days' contact no trace of starch in solution as tested by iodine. The expressed liquid has lost its opalescence.

Mixture of Dye-stuffs.—Methylene blue in the presence of eosin rapidly yields all the blue to the fibre which is stained blue. The expressed liquid appears to contain eosin only.

Radio-active Substances.—Radio-active water from St. Austell, Cornwall, was placed in contact for one week; the radio-activity of the liquid diminished from 7 to 3. Five per cent. thorium nitrate solution placed in contact for three weeks; the emanations of the expressed liquid had diminished from 22 to 2. There was no appreciable diminution of the nitric acid in the liquid computed as nitrate, while conductivity tests gave the following results:

Liquid Tested.	Conductivity of Expressed Liquid.	Emanation Activity.
Distilled water	3.20	Nil.
Distilled water + 5 % thorium nitrate	17,472.0	22
Distilled water + Russian asbestos (50 %)	1,728.0	Nil.
Distilled water + 5 % thorium nitrate + Russian asbestos (50 %) —after twenty-one days' contact	16,832.0	2

[NOTE.—Mr. S. A. Edmonds, of the Physics Department of Leeds University, to whom I am indebted for the figures relating to the emanation activities, has kindly undertaken to investigate generally the fate of radio-active substances in the presence of asbestos, and a preliminary note on the outcome of his work is appended.]

Degelling Phenomena.

Watery gelatine (10 per cent.), watery agar (1 per cent.), watery isinglass (3 per cent.), after melting, are placed in contact for twelve hours with asbestos fibre at refrigerator temperature. Thereupon the expressed liquids are found to have lost the power of setting.

Bacterial Poisons.

Solutions of tuberculin, mallein, diphtheria toxin, and tetanus toxins, when diluted 1 in 25 in normal saline and placed in contact with the fibre, appear rapidly to lose the whole of their toxicity, as far as can be judged, within twenty-four hours.

With regard to diphtheria and tetanus toxins, the strength of the solutions taken was such that 1 c.cm. contained 400 × M.L.D. A volume of the exudate equal to 50 × M.L.D. of the untreated diluted liquid proved entirely non-toxic to animals, while the reaction changed likewise from markedly positive biuret to one entirely negative.

In the case of Koch's old tuberculin a reaction occurs during contact which may be divided into two stages: (*a*) The proteoses entirely disappear and the biuret reaction becomes negative; (*b*) later the toxicity diminishes, the latter being tested by biological reactions both in tuberculous man and tuberculous guinea-pigs.

Using the diluted toxins of diphtheria and of tetanus, diluted to such strength that 0.1 c.cm. contains 1 × M.L.D., contact with asbestos leads to an immediate loss of the toxicity of the liquid, and a like loss of potency ensues with diluted antidiphtheritic serum in which 0.1 c.cm. contains unit protective dose.

It is important to note that the extract from a mixture of asbestos fibre and distilled water after being in contact for several weeks does not, when added directly to these toxins or antitoxin serum, materially diminish their potency.

In extremely dilute solutions glass wool appears to have little effect upon the toxins of diphtheria or of tetanus. These, however, appear to be slowly destroyed in the presence of finely divided china clay or of animal charcoal. Cotton-wool, after being cleansed with alcohol and ether, has a somewhat similar effect, but the reaction is better marked with diluted tuberculin and mallein (1 in 25),

The action of asbestos fibre on concentrated toxins, using a toxin the strength of which is such that 1 c.cm. contains 400 × M.L.D. placed in contact with asbestos 50 per cent. by weight, is as follows:

Material Used.	M L.D. Doses Given.	Death.	M.L.D. Doses Given.	Death.
A. Diphtheria toxin—1 c.cm. contains 400 × M.L.D. (control)	1.5	< 30 hours	1	30 hours
B. = A. after 24 hours' contact	1.5	60 hours	1	44 hours
C. = A. after 48 hours' contact	1.5	120 hours	1	Not killed in 17 days
D. Tetanus toxin—1 c.cm. contains 400 × M.L.D. (control)	1	4 days		
E. = D. after 24 hours' contact	250	6 days		
	117	19 days		
	45	Did not kill in 42 days		
	22			

The action of asbestos fibre is obviously greater upon concentrated tetanus toxin solution than upon an equally concentrated diphtheria toxin.

Growth of Virulent Organisms upon Nutrient Broth containing 7½ per cent. by Weight of Russian Asbestos Fibre.

B. tuberculosis (Human and Bovine Types).—After five months there is a fair amount of growth. The liquids are proteose- and peptone-free, and their toxicity is about equal to that of control cultures grown on normal glycerine broth which had to be freed of proteoses by precipitation with alcohol. The

exudate from the asbestos broth culture has been tested by means of the Lignière, Woodcock, and von Pirquet methods of cutaneous reaction and, broadly, the results are comparable. The organisms in one culture flask (*T. bovinus*), however, seem to have lost all their virulence, as tested upon twelve guinea-pigs, none of which, at the end of six weeks following inoculation, have developed signs of tuberculosis on *post-mortem* examination. The organisms derived from the culture flask sown with *T. humanus* appear to have lost none of their virulence in a parallel test now being conducted. The organisms show certain changes both in morphological and staining appearances.

B. anthracis; B. pestis.—One strain of each type has been under observation. The organisms show certain changes in morphological and staining appearances and have lost a great measure of their virulence during two months' growth. Mice inoculated with small quantities of the expressed fluids are apparently unaffected.

B. diphtheriae (American Variety).—No toxin appears in the asbestos broth culture at the end of eight days' growth; 5 c.cm. of the expressed liquid is without harmful effect when inoculated subcutaneously into guinea-pigs, whereas $\frac{1}{10}$ c.cm. of the control broth culture proved fatal within thirty-six hours. There is a great alteration in the staining and morphological appearances in the growth on asbestos broth, while the intensity of the biuret reaction of the expressed fluid is less than 2 per cent. of that of the control.

NOTE ON THE ACTION OF ASBESTOS UPON RADIUM AND THORIUM IN SOLUTIONS OF THEIR SALTS.

By S. A. Edmonds, A.R.C.Sc., F.R.C.Sc.I.,
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This investigation was suggested by Dr. Coplans, and it was thought that a short account of the results achieved might be of interest in conjunction with his work on asbestos.

Preliminary experiments showed that asbestos had the power of diminishing the activity of a solution of a radio-active body. Thus, 25 grams of Russian asbestos were left in contact for one week with 50 c.cm. of radio-active water from the Cornish Radium Mine, and the solution extracted from this asbestos by pressure possessed only three-sevenths of the activity of the original solution, while another 25 grams of the same sample of asbestos left in contact for three weeks with 50 c.cm. of a 5 per cent. solution of thorium nitrate yielded 12.5 c.cm. of liquid with an activity per cubic centimetre diminished to one-eleventh of the original solution, the asbestos retaining the remainder of the active thorium and being correspondingly radio-active, the total activity of asbestos and liquid being the same as that of the thorium solution before treatment with the asbestos fibre.

The active product in the asbestos could not be washed out with distilled water, but on boiling with 300 c.cm. of water for four hours, about 100 c.cm. of cloudy solution were eventually obtained with an activity per cubic centimetre of one-fifteenth of that of the original solution. The deposit from this cloudy solution was inactive, and the total activity thus recovered in the extracted liquids was one-sixth of that of the original liquid, while the asbestos retained an activity equal to five-sixths of that of the original thorium nitrate solution.

A solution of thorium nitrate was then made up, 1 gram in 200 c.cm., and different weights of chrysotile-asbestos from Canada were sealed in contact with 50 c.cm. of this solution for four days, after which they were compressed.

The volume of liquid thus extracted was measured, the remaining compressed solid was weighed, and the activities of each obtained by the "emanation method," as devised by Boltwood (*Phil. Mag.*, 1905).

The solution under test was boiled *in vacuo*, and the dissolved gases driven through a drying tube into an ionization chamber connected to an electrometer, the deflections of which were proportional to the ionization currents produced in the gas in the chamber by the α particles shot out from the emanation on disintegrating. While devised primarily for radium emanation, the method of estimation can be used for thorium, provided the gases are admitted quickly into the chamber—thorium emanation decaying to half its strength in one minute—and may be calibrated by repeating the test with standardized radium or thorium solutions.

The activity thus measured is proportional to the amount of thorium or radium emanation present, and consequently to the amounts of thorium or radium from which these emanations were produced.

The results of testing Canadian asbestos (chrysotile) were as follow:

Quality of Fibre.	Weight (Grams).	Liquid Removed (c.cm.).	Emanation Activity		
			Of Liquid.	Of Asbestos.	Per Gram Asbestos.
	A.	B.	C.	D.	E.
1. Canadian, fine ...	2.17	46.5	4.51	0.79	0.363
2. ,, ,,	3.85	46.0	3.95	1.35	0.351
3. ,, ,,	5.10	43.5	3.44	1.86	0.365
4. ,, coarse	3.34	47.0	4.19	1.11	0.333

Time of contact: 4 days. Emanation activity of original liquid: 5.30.

After eight days' contact the figures showing the loss of emanation activity by the asbestos used in experiments 1, 2, and 3 are respectively 0.63, 0.65, and 0.64 per gram.

The numbers in columns C and D represent the thorium contents of the extractate and the asbestos respectively, while in column E it is seen that, using different weights of fine Canadian fibre, equal amounts of thorium are removed per gram, so suggesting a chemical replacement of the magnesium in the chrysotile (usually a magnesium silicate combined with various oxides) by the thorium.

The amount of nitric acid present in the liquid reckoned as nitrate appears to be unchanged throughout the process.

It is hoped to elucidate these phenomena by further research.

HYPERTHYROIDISM: ITS EXPERIMENTAL PRODUCTION IN ANIMALS.

By Rupert Farrant, F.R.C.S.,
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Exophthalmic goitre in man is generally held to be due to thyroid changes producing an increased secretion, which is the immediate cause of the symptoms and the pathological changes of the disease. These suppositions appear to be borne out by the results obtained in the treatment of the disease by partial thyroidectomy. Observers mostly insert a saving clause that the symptoms may be due to an altered secretion, that is, a dysthyroidism rather than a hyperthyroidism.

The essential change in the thyroid is a cell hyperplasia with absence of colloid, the cells are also altered in shape and approach the columnar type. The hyperplasia is commonly associated with a macroscopic enlargement of the gland, sometimes with an adenoma, though cases are recorded where the size remained normal. Walter Edmunds,[1] Halsted and Horsley,[2] found that after partial thyroidectomy in a normal animal the remaining portion enlarged and underwent a histological change indistinguishable from the hyperplasia seen in exophthalmic goitre. Marine and Lenhart[3] hold that thyroid hyperplasia is accompanied with deficiency of thyroid secretion.

Exophthalmic goitre is apparently rare in animals, but undoubted cases of a similar condition have been recorded by Albrecht, Cadiot, Marek, Ries, and Rider, in cows, dogs, and horses. So the symptoms and pathological changes that are due to thyroid excess should be capable of reproduction in animals by thyroid feeding. The results that have been obtained by thyroid feeding are extremely contradictory, as the following short account of the principal published work shows.

Nearly all the observers have obtained in animals increased appetite, loss of weight, gastro-enteritis, and diarrhoea. They appear to agree that the loss of weight is due to an increased oxidation of fat and increased nitrogenous metabolism in cretins, myxoedema, normal man, and in animals (Schoendorff,[4] Underhill and Saiki,[5] Dutto, Reos,[6] and Magnus Levy[7]).

Loss of hair, glycosuria, nervousness, and tremors are among the symptoms that have been described by some observers and not by others. Any observations made as to nervousness are open to error, as animals tend to become more tolerant of man when ill, and estimations made as to their behaviour to some sudden noise are most unsatisfactory. No definite opinion can be given on tremor, as the animals are in a wasted condition and weak; any tremor present may arise from the tachycardia.

Most observers have failed to obtain exophthalmos, but it has been described by Edmunds[8] in monkeys, by Hoennicke[9] in rabbits, by Baruch[10] in dogs, rabbits, and rats; also by Ballet and Enriquez[11] and Gagnevin. It is quite impossible to compare the eyes of thyroid-fed animals to the exophthalmos in man, owing to the anatomical differences and the wasted condition of the animals.

The great question is tachycardia; it has been obtained by the experiments of Ballet and Enriquez,[11] Canter,[12] Georgiewski,[13] Hellin,[14] Lanz,[15] and by von Fürth and Schwarz[16] in dogs and rabbits; in guinea-pigs by Angiolella[17] and Ludke,[18] in goats by Lepine,[19] in rats by Peiser,[20] in monkeys by Edmunds,[8] and in cats by von Fürth and Schwarz. These papers were summarized by von Fürth and Schwarz[16] in 1908, and they concluded that tachycardia could be produced, but not invariably. The more recent workers, especially the American, deny the production of tachycardia; Marine and Lenhart[3] have never produced it in dogs, Cunningham[21] did not produce it in man, monkeys, cats, dogs, rabbits, and chickens by feeding with fresh thyroids, but obtained it by feeding with desiccated thyroid and by subcutaneous injections. Carlson, Rooks, and McKie[22] did not observe it in pigeons, chickens, rabbits, ducks, guinea-pigs, rats, foxes, cats, dogs, and monkeys.

In all these experiments the heart-rate was taken by the finger, and this has often proved unsatisfactory—for example, Carlson found that no observations could be made on monkeys, foxes, or rats, as they were too excitable, while dogs' hearts were too irregular, and those of rabbits and guinea-pigs too rapid, and he appears to have made no attempt to count the rate in ducks or chickens. So his categorical statement is based on observations on two cats, one of which was pregnant. His observations would carry greater weight if they were controlled by the use of some instrument such as a polygraph. The contradictory results obtained thus make it uncertain whether the tachycardia of exophthalmic goitre can be reproduced by thyroid feeding, though most authors appear to hold that it results from it. (See Biedl and Swale Vincent.)

Some observers have used exophthalmic goitre thyroid, and have obtained contradictory results. Soupault[23] fed guinea-pigs with it, and found it less active than normal thyroid. Schoenborn[24] used it on cats and rabbits, and found no essential difference from the normal. Klose and Lampe,[25] Klose and Liesegang[26] produced tachycardia in nervous fox terriers by using exophthalmic goitre thyroids within half an hour of their removal, and concluded that the results were due to some dysthyroidism. Fonio[27] and Marine[28] found that exophthalmic goitre thyroid was no more active than thyroid of a similar iodine value. The previous observers had not estimated the iodine value.

The conflicting results may be due in part to the different preparations that have been used and to the different methods of administering them. The preparations have varied from fresh glands, normal or goitrous, thyroid powder, iodothyrin, thyroglobulin, glycerine extracts, colloid solutions, to iodized protein. For the most part the iodine has not been estimated, and when this has been done it was found to be low. The preparations were introduced intraperitoneally, subcutaneously, in the food or in gelatine capsules. The iodine content is of the utmost importance. Marine and Lenhart[29] found that the compensatory hypertrophy after partial thyroidectomy could be prevented by the administration of iodine. Marine and Williams[30] found that the physiological value of the thyroid was dependent on its iodine content. Stoland,[31] a pupil of Carlson, by feeding experiments, found that thyroids of a low iodine value were less toxic than those of a high value.

Technique.

The selected animals—cats, rabbits, guinea-pigs, and dormice—were taken as being typical, carnivorous, herbivorous, and hibernating. The last were investigated in order that the effect might be noted on the large thymus these animals possess in the winter months. The material used was Duncan and Flockart's thyroidea sicca. A sample of this was found to contain 0.3289 per cent. of iodine. Marine and Lenhart found that normal to colloid glands contained 0.4–0.95 per cent. The material used in my experiments thus contained a high percentage of iodine, and, according to Marine, would have a high physiological value. It is about three times as high as that used by Carlson, Rooks, and McKie, which contained only 0.08–0.13 per cent.

The powder was given in the whole state mixed with either milk or meat, and was taken quite readily; if any was left over it was added to the next meal.

In one experiment subcutaneous injections of thyroid purified according to Hutchison's method were given. In three cats thyroid that had been previously subjected to gastric digestion for 12 hours was employed. An objection was open, that any of these might contain some toxic agent other than thyroid, so three controls were taken by previously boiling the thyroid for some minutes. As the same effects were produced by all these methods in cats, it was not thought necessary to repeat the controls for the other animals. Controls were kept of all the animals, to note the effect of confinement in the laboratory; these remained normal and put on weight, except the dormice.

Accurate records were made of the pulse rates, by means of a polygraph, and these rates were compared with estimations made directly; the direct observations invariably proved inaccurate. There was no difficulty in using the polygraph, the animals were placed in the observer's lap, and petted until they became quite quiet, when the tambour was placed over their heart and records taken. All tracings were discarded, where there was any question of any increased rate from either movement or excitement.

No attempt was made to record either the temperature or the respirations. Owing to the difficulty in collecting the urine free from contamination only occasional tests were made for sugar in cats. The morbid changes were examined both macroscopically and microscopically; other observers have not examined the organs microscopically. The nervous system was not examined histologically, as a very large series would have been necessary to be of any value, owing to the irregularity of the appearance of changes in the nervous system in exophthalmic goitre.

EFFECTS PRODUCED.

1. *Cats.*

Thirteen cats were divided into five groups.

A. Four cats fed on thyroid powder.
B. One cat injected every day with a 2½ per cent. solution of purified thyroid (subcutaneously).
C. Three cats fed with previously digested thyroid.
D. Three cats fed on previously boiled thyroid.
E. Two cats kept without thyroid feeding.

The doses given were from 1 to 3 grams per day.

The results obtained in the first four groups were similar, and so may be taken together.

General Account.—The effect of the thyroid feeding produced but little change during the first three days. On about the fourth day the animals became suddenly weak and went off their legs; this stage of weakness passed off in about forty-eight hours, but then the toxic symptoms mentioned below set in and slowly progressed until the animals became moribund. Some of the cats appeared for a time to come to a standstill, but they eventually succumbed. In four the feeding was stopped when they became moribund, as they were required for other purposes.

Fur Changes.—The hairs came out and the fur became unkempt; when the animals died the fur was very thin.

Body Weight.—There was a gradual loss of body weight from 28 to 53 per cent. This was accentuated at those times when food was refused and occurred most rapidly two to three days before death. Muscular weakness corresponded to the loss of weight. In the two cats in which the thyroid feeding was stopped and which were allowed to recover, a steady increase of weight followed.

Alimentary Tract.—Salivation took place during the later stages of the experiments, its intensity varied with different cats, at the last it was represented by a thick ropy mass hanging from the mouth. The appetite was much increased though occasionally they would refuse all food for two or three days at a time. Diarrhoea constantly occurred even in the cat subjected to subcutaneous injections.

Glycosuria.—The urine reduced Fehling in some of the cats, but not in others.

Circulatory.—The daily records made with the polygraph showed that the pulse-rate steadily increased. The highest was 384. The heart's impulse appeared to be diffused over a larger area of the thorax than previously. The rates steadily diminished in the two cats in which the thyroid feeding was stopped.

Exophthalmos.—There was no prominence of the eye that could be compared to that seen in exophthalmic goitre.

Tremors.—The cats became tremulous, and the hair

could be seen to shake, but it was quite impossible to differentiate this from the effects of the general weakness and rapidity of the heart's action. It cannot be compared to the tremor of exophthalmic goitre.

Nervousness and Excitability.—The cats during the experiments became quite tame, and purred on being handled; in the later stages they appeared to start at a sudden noise.

Macroscopic Post-mortem Appearances.—There was almost entire absence of fat, the muscles were extremely wasted. The intestinal mucous membrane showed haemorrhagic changes, but not invariably. The intestinal contents were conspicuous by the absence of worms, which are generally present in large numbers in normal cats. The mesenteric lymph glands were sometimes enlarged, but not more so than is commonly seen in cats, so that no comparison can be made with the lymphoid changes seen in exophthalmic goitre.

Morbid Histology.—This will be described with that occurring in rabbits.

The following is an account of each individual cat:

GROUP A, No. 1.

Date.	Thyroid per Day.	Body Weight.	Average Pulse.
	Grams.	Grams.	
November 23, 1910	1	3,560	153
December 3, 1910	1	2,650	232
December 5, 1910	1	2,410	Dead

Feeding days 11. The cat died, having lost 32.5 per cent. of its total body weight.

GROUP A, No. 2.

Date.	Thyroid per Day.	Body Weight.	Average Pulse.
	Grams.	Grams.	
December 9, 1910	1	1,850	132
December 15, 1910	1	1,750	160
December 22, 1910	1	1,630	214
January 7, 1911	Stopped	1,440	272
January 21, 1911	Nil.	1,520	210
January 30, 1911	Nil.	1,550	176

Feeding days 33. When the feeding was stopped the cat was extremely weak, and had lost 28.7 per cent. of its body weight; it was obvious that it would have died in the next few days had the feeding been continued. On January 30th, twenty-two days after the feeding had been stopped, the cat had regained 180 grams in weight and its heart-beat had fallen from 272 to 186.

GROUP A, No. 3.

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
March 31, 1911	3	100	3,070	160
April 7, 1911	3	100	2,690	263
April 19, 1911	3	50	1,760	320

Feeding days 19. The cat died, having lost 42.9 per cent. of its body weight. Its pulse-rate rose from 120 to 320.

GROUP A, No. 4.

This cat was fed on 1.5 gram of thyroid daily from November 23rd to December 1st, 1910. It was pregnant, and aborted on the fifth day after the feeding commenced; the kittens were not full term, and they died in about half an hour. The cat died on the eighth day. Carlson fed a cat when pregnant on thyroid, and it carried its kittens to full term on the seventy-second day, but his cat was given increasing doses, starting with 0.5 gram, and the iodine value was low.

GROUP B.

This cat received fifty-eight subcutaneous injections of 5 c.cm. thyroid solution. The 5 c.cm. corresponded to 6 grams of thyroid powder.

Date.	Weight.	Average Pulse.
	Grams.	
December 9, 1910	2,610	160
December 16, 1910	2,440	192
January 2, 1911	2,360	144
January 30, 1911	2,000	240
February 12, 1911	1,700	384
February 26, 1911	1,670	300
March 9, 1911	1,780	225

From December 23rd to January 2nd the cat received no injections. They were continued from January 2nd to February 12th, when they were finally stopped owing to the development of an abscess in the neck. It had lost 37.1 per cent. of its body weight. On March 9th—twenty-five days after the injections were stopped—it had regained 50 grams in weight, and its pulse dropped from 384 to 225—a fall of 159 per minute.

GROUP C, No. 1.

Date.	Thyroid per Day.	Weight.	Average Pulse.
	Grams.	Grams.	
January 30, 1911	1	3,400	182
February 6, 1911	1	3,400	192
February 13, 1911	1	3,360	217
February 27, 1911	1	2,780	270
March 8, 1911	1	2,250	293

The cat died on the thirty-seventh day, having lost 33.8 per cent. of its total body weight.

GROUP C, No. 2.—*Digested Thyroid.*

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
April 1, 1911	3	150	4,190	150
April 15, 1911	3	150	3,590	246
April 29, 1911	3	150	3,580	294
May 13, 1911	3	150	3,070	320
June 4, 1911	3	150	2,720	312

Feeding days 65. It was killed when moribund, having lost 35.1 per cent. of its body weight.

GROUP C, No. 3.

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
April 1, 1911	39	100	2,610	170
April 8, 1911	39	100	2,350	251
April 22, 1911	39	100	1,650	293
April 27, 1911	39	100	1,460	

On the last date the pulse was irregular and intermittent. The cat died on the twenty-fourth day, having lost 37.5 per cent. of its total body weight.

GROUP D, No. 1.—*Boiled Thyroid.*

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
December 7, 1910 ...	1	—	2,780	127
January 1, 1911	1	—	2,430	131
January 15, 1911	1	—	2,060	169
January 29, 1911	1	—	2,050	190
February 12, 1911	1	—	1,950	255
February 26, 1911 ...	1	—	1,640	283
March 16th, 1911	1	—	1,290	320

The cat died on the ninety-eighth day of thyroid feeding, having lost 53.8 per cent. of its total body weight. Its pulse-rate increased 204 per minute.

GROUP D, No. 2.

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
April 1, 1911	3	100	2,010	195
April 14, 1911	3	100	1,670	288
April 24, 1911	?	?	1,160	384

The cat went off its food on the twentieth, and no thyroid was taken after the twenty-second. Number of feeding days twenty. The cat died on the twenty-fifth day, having lost 42.3 per cent. of its total body weight.

GROUP D, No. 3.

Date.	Thyroid per Day.	Meat.	Weight.	Average Pulse.
	Grams.	Grams.	Grams.	
April 1, 1911	3	100	3,020	162
April 14, 1911	3	100	2,480	192
April 28, 1911	3	100	2,390	272
May 8, 1911	3	100	1,930	303

The cat was killed on the thirty-eighth day of the experiment, when moribund. It had lost 36.1 per cent. of its total body weight.

GROUP E.—*Control Cats.*

These two cats steadily increased in weight, and their pulse-rates varied between 120 and 190.

2. *Rabbits.*

Nineteen rabbits were fed on thyroid in milk in doses varying from 0.2 to 1 gram daily. They rapidly lost

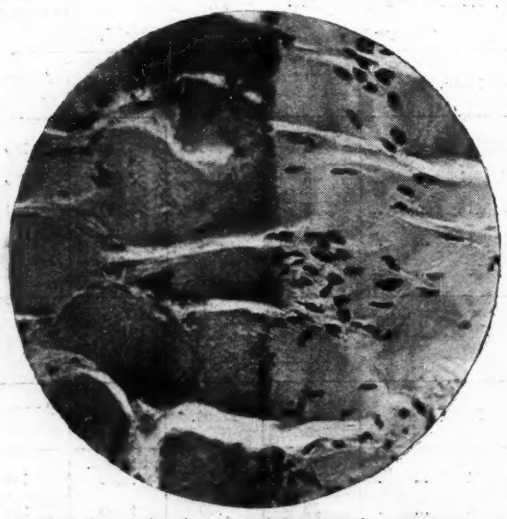


Fig. 1.—Cat's heart showing type of degeneration, cut transversely and vertically.

weight and died, except five in which the experiments were not pushed to their termination. Death occurred from the fifth to the nineteenth day with one exception; this one survived twenty-eight days. The fur became unkempt and fell out. The loss of weight varied from 19 to 42 per cent. of their total body weight. The appetite was much increased, and they ate ravenously right up to the time of their death. Diarrhoea was a constant symptom, but no salivation was noted. The urine was not tested or estimated. The pulse-rate steadily increased, the highest recorded being 420 per minute. No exophthalmos or constant alteration in the nictitating membrane was noticed. The rabbits became weak and tremulous, but no comparison can be made between this and the tremor of exophthalmic goitre.

Three of the five rabbits in which the experiment was not pushed to a termination died suddenly while being given ether as an anaesthetic.

Naked-eye Morbid Anatomy.

There was extreme wasting of the fat and muscles. The stomach invariably was found full of food; the intestinal mucous membrane showed haemorrhagic changes.

No enlargement was seen of the lymphoid group of glands.

The following may be taken as a typical feeding experiment on a rabbit:

Date.	Thyroid.	Weight.	Average Pulse.
	Grams.	Grams.	
December 7, 1910	0.2	2,150	167
December 9, 1910	0.2	2,040	192
December 14, 1910	0.2	1,775	240
December 19, 1910	0.2	1,320	352
December 20, 1910	0.2	1,290	Dead

The Morbid Histology of Thyroid Fed Cats and Rabbits.

Evidence of the extreme degree of fat absorption is seen in the illustration, which represents a cat's omentum spread out on a slide.

Muscles and Heart.—The change seen in the heart varied from a condition of general wasting of the fibres to what may be described as a condition of hyaline degeneration. The fibres appeared swollen with few nuclei and no processes or transverse striations; both the fibres and the nuclei stained badly. Fig. 1 shows this appearance; it corresponds to a myocarditis without evidence of inflammation.

Kidneys.—The majority of sections showed no change, but in some, as in Fig. 2, there was a condition approaching tubular nephritis; the cells were in a peculiar swollen condition, without evidence of inflammation.

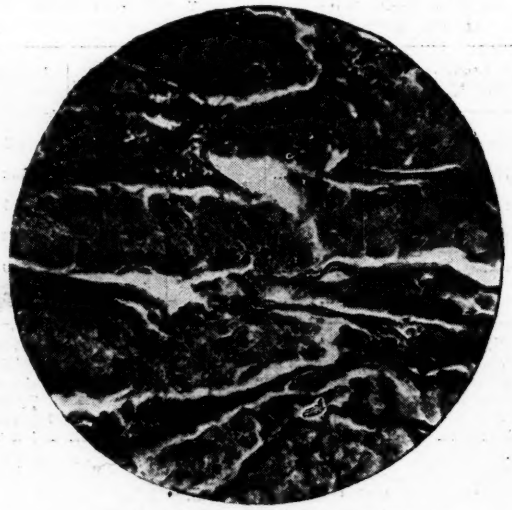


Fig. 2.—Cat's kidney showing degeneration

Liver.—The liver showed a condition of fatty degeneration, most marked around the centre of the lobules.

Pancreas.—Certain of the animals were killed, so that an immediate *post-mortem* examination might be done and the true condition of the pancreas ascertained uncomplicated by *post-mortem* degeneration. Considerable enlargement of the islets of Langerhans was seen. Others showed a degeneration of the islets with fibrosis, but the possibility arises that this fibrosis might have been due to previous inflammation independent of the thyroid feeding.

Ductless Glands.—The thyroid showed a marked increase in the staining capacity of the colloid, otherwise it was quite normal. No change was found in the pituitary or adrenal. The most constant of these changes was the enlargement of the islets of the pancreas and the alteration in the heart. The degrees of the changes in the organs varied in each individual animal; all the changes were not to be seen in any one animal.

Guinea-pigs.

Fifteen were fed on thyroid daily, from 0.2–0.6 gram. The fur changes, loss of weight, diarrhoea, and increased appetite that occurred agreed with the changes seen in

the rabbit; the naked-eye pathology was also similar. No observations were made as to the occurrence of tachycardia owing to the tambour being too big to fit over a guinea-pig's heart.

Dormice.

Twelve dormice were fed on 0.025 gram of thyroid a day, twelve others were used as controls. Beyond falling out of the fur, diarrhoea and loss of weight, no changes were to be noted. They died in four to nine days, having lost 13 to 38 per cent. of their weight. The main object of the experiment was to notice the effect on the thymus. It was found that it had diminished; in some at the time of death it was quite small, and no fat was to be seen in it, whilst others died before all the fat had disappeared.

The control dormice lost some weight, but appeared healthy when the thyroid fed ones died, but they themselves died one night, presumably owing to a hard frost.

Comparison of the Effects in these Animals.

The effects produced by thyroid feeding in cats, rabbits, guinea-pigs, and dormice may be compared as follows:

The cats proved the most resistant, the other three were very susceptible; the rabbits lived longer than the guinea-pigs; this one would expect from their size.

Carlson suggested that the difference in the resistance of carnivorous and herbivorous animals might arise from some toxic effect of animal protein to herbivora, but French,[18] one of Carlson's pupils, found that large quantities of meat could be given to herbivora without producing any toxic effect.

The cardinal symptoms in all were fur changes, loss of weight, weakness, increased appetite and diarrhoea.

Tachycardia was well marked in the cats and rabbits, but no reliable observations could be made in either the guinea-pigs or the dormice, owing to the difficulties involved in their small size. The question arose in cats and rabbits as to the occurrence of nervousness and tremors, both of which, along with exophthalmos, have been observed in higher animals—by Edmunds in monkeys, and by Notthaft[32] in man.

Comparison with Exophthalmic Goitre.

A comparison of the symptoms obtained may be made with those seen in exophthalmic goitre. In making this comparison, it should be borne in mind that the length of time over which thyroid excess is produced in animals is much less than the duration of the average case of exophthalmic goitre; also the amount of thyroid given daily represented a much larger quantity than the whole gland of the animal. An early acute case is the most suitable for comparison.

The change in the fur is analogous to the change in the hair. The loss of weight, from 28 to 53 per cent. in cats, and from 19 to 42 per cent. in rabbits, agrees with the average or extreme loss seen in the disease. The salivation seen in cats corresponds to the moistness of the mouth. The appetite is rather different, as the typical appetite of exophthalmic goitre is capricious whilst that of the thyroid fed animals is increased until they are very ill. Diarrhoea is an almost constant symptom in both, as also is tachycardia. The occasional glycosuria, seen in cats, agrees.

Exophthalmos for the most part can be said not to be present and tremor cannot be distinguished as such, nervousness remains doubtful. Fineness of the skin and sweating cannot be reproduced in these animals for obvious reasons.

In a comparison of the morbid anatomy the changes may be divided into two main groups, other than changes in the nervous system which were not looked for.

The fat absorption, muscular wasting, degeneration of the heart, kidneys and liver, the enlargement of the islets of Langerhans, and the haemorrhagic changes in the intestine are to be found in both. The type of the degeneration, a hyaline without evidence of inflammation, agrees, also the uncertainty of their occurrence. The second group consists of those that are found in exophthalmic goitre, but cannot be reproduced in animals by thyroid feeding. They are the hyperplasia of the thyroid, the alteration in the pituitary, the enlargement of the spleen and certain lymph glands. Of these the hyperplasia of the thyroid is not to be expected in animals fed on thyroid gland, so that the chief differences between exophthalmic goitre and experimental hyperthyroidism consist in the absence of the alterations in the latter in the pituitary, spleen and lymph glands.

SUMMARY.

One may conclude that thyroid feeding is toxic to these animals, but that their resistance varies both as to the species and to the individual of that species.

A complete picture of exophthalmic goitre cannot be reproduced in these animals, but a modification can be produced that resembles the disease in certain features. These are fur changes, loss of weight, bodily weakness, diarrhoea, tachycardia, and occasional glycosuria, combined with a disappearance of fat, muscular wasting, degeneration of the heart, liver, and kidneys, enlargement of the islets of Langerhans, and haemorrhagic changes in the intestine. The deduction can be made that the thyroid hyperplasia of exophthalmic goitre is associated with excess of secretion, and that this is the cause of these symptoms and morbid changes.

It is suggested that in regard to symptoms that cannot be reproduced no deduction can be made either as to their being or not being caused by thyroid excess, owing to the anatomical and other differences between animals and man.

The absence of the morbid changes in the ductless glands and lymphoid system precludes their production by thyroid excess.

The experimental work was done at University College in Professor Cushny's laboratory. I am much indebted to him for his care and supervision, without which the work would have been valueless. I am also indebted to Dr. Marris for the loan of his polygraph.

REFERENCES.

[1] Walter Edmunds, *Journ. Path. and Bact.*, 1838, v. [2] Horsley, British Medical Journal, 1896, ii. p. 1821. [3] Marine and Lenhart, *Arch. Int. Med.*, 1911, viii, pp. 265-346. [4] Schoendorff, *Arch. für die gesammte Phys.*, 1897, lxvii, p. 395. [5] Underhill and Saiki, *Journ. Biol. Chem.*, 1908, v, 235. [6] Roos, *Zeit. für Physiol.*, 1912, xxx, No. 1, p. 56. [7] Magnus Levy, Van Noorden, *Handbuch. der Pathol. der Stoffwech.*, 1907, ii, p. 312. [8] Edmunds, *Lancet*, May, 1900. [9] Hoennicke, *Verh. des Congresses f. inn. Med.*, 1906. [10] Baruch, *Zentralbl. f. Chir.*, 1912, xxxix, p. 316; 1911, xxxv. [11] Ballet and Enriquez, *Semaine Médicale*, 1894, pp. 636-569. [12] Canter, Ext. des *Ann de la Soc. Méd. Chir. de Liège*, January, 1895. [13] Georgiewski, *Zeit. f. klin. Med.*, 1897, xxxiii, p. 153. [14] Hellin, *Arch. f. exp. Path.*, 1898, xl, p. 121. [15] Lans, *Deut. med. Woch.*, 1895, p. 597. [16] Von Fürthand Schwarz, *Pfluger's Archiv*, 1908, cxxiv, p. 361. [17] Angiolella, *Annali di Neurologia*, 1897, xv. [18] Ludke, *Muench. med. Woch.*, 1905, p. 1494. [19] Lepine, *Lyon Méd.*, 1903, November, p. 58. [20] Peiser, *Zeit. f. exp. Path.*, 1905, iii, p. 515. [21] Cunningham, *Journ. Exper. Med.*, 1898, iii, p. 147. [22] Carlson, Rooks, and McKie, *Amer. Journ. Physiol.*, 1912, xxx, No. 1. [23] Soupault, *Revue de Neurol.*, 1897, p. 630. [24] Schoenborn, *Arch. f. exper. Path. u. Pharmakol.*, 1909, lx, p. 390. [25] Klose, *Arch. f. klin. Chir.*, 1911, xcv, p. 619. [26] Klose, Lampe, and Liesegang, *Beitr. z. klin. Chir.*, 1912, lxxvii, p. 601. [27] Fonio, *Mitt. a. d. Grenzgeb d. Med. u. Chir.*, 1911, xxiv, p. 123. [28] Marine, *Journ. Amer. Med. Assoc.*, 1912, lix, v. [29] Marine and Lenhart, *Johns Hopkins Bull.*, 1909, xx, No. 218. [30] Marine and Williams, *Arch. Int. Med.*, 1908, May. [31] Stoland, *Amer. Journ. Physiol.*, 1912, xxx, No. 1. [32] Notthaft, *Centralb. f. inn. Med.*, 1833, xix, p. 353. [33] French, *Amer. Journ. Physiol.*, 1912, xxx, No. 1, p. 56.

DISCUSSION.

Dr. CROFTON asked for information concerning the occurrence of glycosuria and albuminuria in the experimental animals.

Mr. FARRANT replied that the difficulties of collecting urine in animals without contamination were great, but that glycosuria was not infrequent.

ON THE VALUE OF THE BLOOD COUNT AS AN AID TO DIAGNOSIS IN OBSCURE BACTERIAL AND OTHER INFECTIONS.

By H. MILLER GALT, M.B., B.Sc.Glasg.,

Pathologist to the "Stephen Ralli" Memorial Laboratory, Royal Sussex County Hospital, Brighton.

BRIEFLY this is a plea for the much more extended use of the examination of the blood as an aid in diagnosis and a guide to treatment.

Within certain fairly well defined limits there is a very remarkable constancy of the histological elements of the blood. All these elements, however, are liable to alteration in number and character under certain influences, mostly toxic; this is particularly the case with regard to the leucocytes, which show fluctuations under very slight influences.

With regard to the leucocytes, the usual alteration is in the form of increase in number—leucocytosis. This may be in the form of a simple leucocytosis, with a proportionate increase of all the varieties of leucocytes. On the other hand, the increase may entirely or specially affect the polymorphonuclears, the lymphocytes, or the cosinophiles — polymorphonuclear leucocytosis, lymphocytosis, eosinophilia. In some bacterial infections the unusual form of leucopenia is manifested; this, again, may be general or special. Lastly, there may be diurnal, seasonal, digestive and other leucocytic fluctuations which may be considered normal.

The chief alterations of the erythrocytes are with regard to number and haemoglobin content. In this connexion the relation between these two factors—the colour index—is an important one.

The term "homogeneous anaemia" may be applied to cases where all the histological elements of the blood are proportionately diminished.

In general it may be said that there are few pathological conditions which do not show some associated alteration in the blood count, while in other cases a negative result from the examination may be equally valuable.

Of diseases associated with leucocytosis we have examples in the following: abscesses in general, practically all local inflammatory conditions, diffuse suppurative processes, lobar pneumonia, acute rheumatism, endocarditis, the infective fevers generally (with a few remarkable exceptions as noted under), hepatic cirrhosis, acute yellow atrophy of the liver, ptomaine absorption, and often malignant disease in the later stages.

Of the diseases associated with leucopenia the two most striking examples are enteric fever and kala-azar. With regard to the former I personally place greater reliance upon the leucocyte count than upon Widal's reaction; many cases in my own experience have been substantiated thus where the Widal's reaction has been indefinite or even negative. The other striking condition accompanied by marked leucopenia is kala-azar; in one case of this I obtained a leucocyte count of 350.

Myelocytes are always abnormal in healthy blood, though it is stated by some authorities that occasionally a cell indistinguishable from a myelocyte may be found in apparently healthy blood. In spleno-medullary leukaemia myelocytes are abundant and are characteristic of this disease.

Splenic anaemia and the severer anaemias generally are also usually accompanied by a more or less marked leucopenia. Finally, there are a number of conditions where the leucocyte count is affected slightly or not at all. We have examples of this in influenza, malaria, mumps, and uncomplicated tuberculous conditions; also some cases of acute nephritis.

Turning to the erythrocytes we have *oligocythaemia* in the later stages of practically all forms of wasting diseases —for example, tuberculosis, malignant disease, chronic lead poisoning, helminthiasis, malaria, and severe haemorrhages generally.

Apart from congenital conditions polycythaemia is rare, and when it does occur is usually very temporary in nature. Visitors to high altitudes usually have evanescent polycythaemia. Then there is the temporary polycythaemia of the newly-born child.

Extreme variations in shape of the red cells—poikilocytosis—may or may not be associated with extreme variations in size—anisocytosis. These two changes are common in all the severe anaemias, and are most marked in those of pernicious type.

Nucleated red cells are always abnormal in the *circulating* blood. Normoblasts are of less significance than megaloblasts, the latter being absent in normal bone marrow, while normoblasts are always found there. In all the forms of severe *secondary* anaemias normoblasts are usually found, but the presence of megaloblasts usually points to an anaemia of true pernicious type.

Basophile stippling of the red cells is also always abnormal, and may exist by itself or in combination with the diffuse form of polychromatophilia, and the latter may again be present without stippling. Both are evidence of immature red cells, and thus they are present in the severer anaemias in general and in some forms of poisoning, notably chronic lead poisoning.

High colour index, if it is marked and persistent, almost invariably points to an anaemia of pernicious type. Low colour index, on the other hand, is common in chlorotic conditions, splenic anaemia, and general malnutrition.

I have given this brief summary in the hope that examination of the blood may become more of a routine practice than it is at present. It seems strange that, while the examination of the urine has become a routine practice, the state of the blood has not received the attention it deserves. It is quite a mistake to imagine that special skill and costly apparatus are necessary; the general practitioner will find that he can obtain in very many cases information of the utmost value with a minimum of trouble. The apparatus is neither costly nor cumbersome, and it can be employed at the bedside with practically no discomfort to the patient.

The evidence obtained by an examination of the blood in this way forms a link in the chain which should not be neglected even in cases where the diagnosis is clear without it. For example, a definite lobar pneumonia which shows a distinct leucopenia on examination indicates a severe and generally fatal attack, and may suggest treatment with the view of producing an "artificial" leucocytosis. In some cases, indeed, the examination of the blood, as in lymphatic leukaemia, may constitute the entire chain of evidence as to diagnosis; in others it may be a centre link without which the other links are inadequate, and even where it forms an end or additional link its value is great.

In conclusion I may quote a few illustrative cases of the value of the blood examination.

1. A youth sent in to the Royal Sussex County Hospital for immediate operation for ruptured appendix. I saw the case on admission. There was deep cyanosis, acutely tender abdomen, and the patient appeared in a moribund condition. Operation was delayed and a blood examination made. This showed a leucocyte count of 2,400, with 45 per cent. of lymphocytes, and on the strength of this I reported that the case was in all probability enteric fever. No operation was done, and the diagnosis was completely established later, recovery following.

2. A young man sent in to the Royal Sussex County Hospital as a case of acute appendicitis. The patient appeared remarkably well, and the pulse and temperature were only slightly above normal, while the abdomen was soft and not tender. Operation was begun while the blood examination was in progress, and the gangrenous appendix with abscess which was present only bore out the blood findings of 27,000 leucocytes, with 87 per cent. of polymorphonuclears.

3. Severe and long-continued anaemia, with occasional remissions, in a lady. Examination of the blood showed 800,000 red cells, leucocytes normal, but marked poikilocytosis, anisocytosis, and nucleated red cells (some of these megaloblasts), all pointing to an anaemia of pernicious type. This case was treated with salvarsan intramuscularly, with rapid and progressive improvement, the patient finally showing perfectly normal blood, and remaining in this state for a period of eighteen months—up to the present time.

4. A case of severe anaemia occurring in a lady, in which no improvement followed various lines of treatment, and in which a blood examination was finally performed. This showed at once that the case was one of acute lymphatic leukaemia, and the fatal conclusion followed shortly after.

Cases like the foregoing might be multiplied *ad libitum* from my own experience, but sufficient has been said to show the advantage to be derived from this easily applied aid to diagnosis, and it is with the hope that the general practitioner will be induced to carry out this examination in many cases that I have ventured to emphasize what is, of course, an admittedly valuable line of investigation.

DISCUSSION.

Dr. J. T. LEON (Southsea) asked as to the strength of solutions used for leucocyte count. He regarded $\frac{1}{3}$ per cent. acetic acid as too weak. He had seen cases of cancer of the stomach in which a pseudo-pernicious anaemia was present. He desired to support Dr. Galt in his plea for a routine examination of the blood, especially from the point of view of those in a general medical practice.

Dr. BERNSTEIN (London) recognized the valuable aid given by blood counts in diagnosis, but wished to point out that here, as in all laboratory work, the blood count could only be of service if used discriminately by clinicians as an adjunct to other methods of diagnosis.

Dr. HICKS (London) also agreed that one must not be a "blood fanatic," and said that correct diagnosis was essential to correct treatment. He quoted some interesting cases.

Dr. CROFTON (Leeds) agreed that blood counts did not point to the cause, as many different causes produced similar results.

Dr. EYRE (President) discussed the leucocytic variations in anomalous cases of pneumonia.

EMPUSA MUSCAE AS A CARRIER OF BACTERIAL INFECTION FROM THE HOUSE-FLY.

[With Special Plate.]

By R. M. BUCHANAN, M.B., F.R.F.P.S.,
Bacteriologist to the Corporation of Glasgow.

CARRIAGE OF BACTERIA BY THE HOUSE-FLY.

IT has been demonstrated within recent years by exact methods of experimental research on the part of several

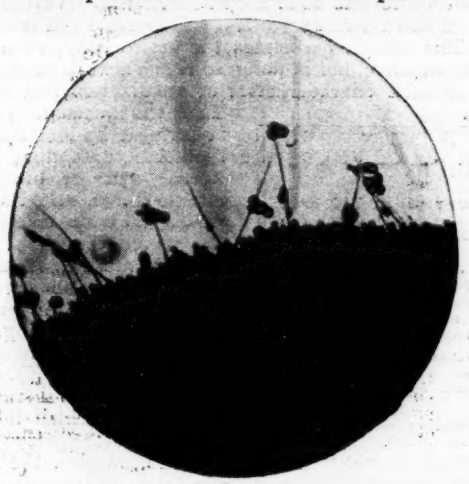


Fig. 3.—Profile view of intersegmental region of *M. domestica* showing the outcrop of conidiophores. Some conidia have been arrested in their outward flight by the setae on which they tend to accumulate in bunches. × 90.

observers that the common house-fly, *Musca domestica*, may carry infection upon the surface of its body and thus act as an agent in the spread of disease. The insect's life-cycle, its habit of life and the conformity of its appendages are even such as to favour the acquisition and distribution alike of pathogenic and non-pathogenic bacteria—the

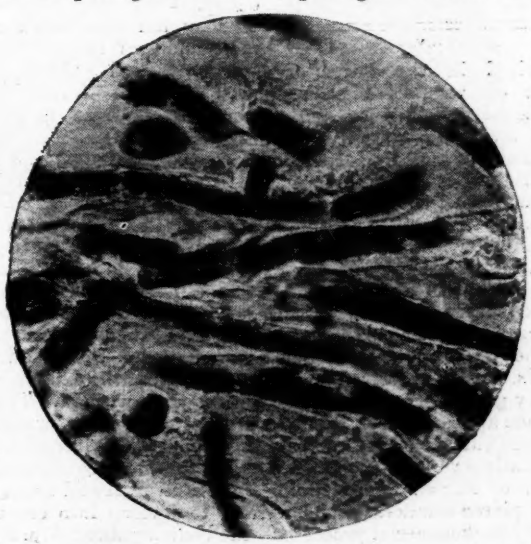


Fig. 5.—*Empusa muscae* invading thoracic muscle. × 500.

species being varied as the substances with which it comes into contact. But while an indefinite variety of bacteria may be carried on the surface of the fly's body valuable work has more recently been in progress showing that a large number of organisms also find natural or temporary lodgement in its alimentary canal.

Thus Graham-Smith (1909), in a series of experiments to ascertain what proportion of flies were infected with organisms of the colon group, isolated thirteen varieties from the intestines, while Nicoll (1911), in studying the natural intestinal flora and following the lines adopted by Graham-Smith, found twenty-seven varieties. Further experiments by Graham-Smith (1910) have shown that while such bacteria only survive a few hours on the surface, others may be retained in the alimentary canal of the fly for seven days under conditions of natural infection (tubercle bacilli in sputum) and for sixteen days under conditions of experimental infection (anthrax spores in emulsion). Again, Bacot (1911), experimenting with *Musca domestica*, has proved the persistence of *Bacillus pyocyaneus* in pupae and imagines raised from larvae infected by pure cultures, and Ledingham (1911), extending

Fig. 10.—Posterior portion of the head of *M. domestica* occupied by *Empusa muscae*. The chitinous plates forming the back of the head capsule are seen on the left. (The formation of gemmae is conspicuous.) Longitudinal section. × 250.

this line of investigation to *Bacillus typhosus*, found that this organism also was able to adapt itself to some extent to the conditions prevailing in the larval and pupal interior (the examination of imagines not having been so far possible).

As regards the presence of infective bacteria in the

Fig. 11.—A fragment of the felted mass of fungal hyphae from the abdominal cavity of *M. domestica* showing the formation of gemmae. × 250.

intestine of the fly under what may be called conditions of natural infection, this has been demonstrated by Ficker (1903), Hamilton (1903), and Faichnie (1909). Moreover, Odlum (1908) and Faichnie brought forward evidence in support of the view that in the transmission of typhoid

infection by flies, the source from which the specific bacilli were chiefly derived was their breeding ground, and that the infection was carried within rather than upon the surface of their bodies.

The experiments and observations of all these observers thus indicate that the alimentary tract rather than the surface of flies plays the more important part in the transmission of infective organisms.

Carriage of Bacteria by Spores of Empusa Muscae.

Another aspect of the subject has presented itself in the course of some observations on the distribution of house-flies in city dwellings, and one which lends support to the latter view. Among the flies collected from different houses by means of fly-papers, individuals began to appear towards the end of August exhibiting the well-known disease due to the parasitic fungus *Empusa muscae* (Fig. 1). Each diseased fly appeared as a centre from which the spores of the fungus were showered in number sufficient to whiten other flies stuck fast on the paper in close proximity. The question thereupon suggested itself as to whether or not the spores carried with them bacteria from the body of the fly. Beyond the fact that the question has in itself considerable epidemiological importance, there is its relation to the transmission of infective organisms from the interior of the fly, and its significance in connexion with the suggestion which has recently been made to propagate the fungus artificially as a means of destroying flies on a large scale, or at least of controlling their number. With the view of determining these points, diseased flies caught during September and October were subjected to cultural tests and microscopical examination, while attempts were made to grow the fungus on nutrient media.

At this stage some reference may be conveniently made to the life-history of the fungus and to the manner in which it displays its parasitism, inasmuch as they have a close bearing upon the results obtained.

Life-history and Parasitism of the Fungus.

Empusa muscae is a member of a small group of fungi, the Entomophthorineae, which live parasitically in certain insects and larvae. Its position amongst fungi is indicated by its close relationship on the one hand to the parasitic Peronosporaceae, whose mycelium is so destructive to the vine, the potato, and other plants, and on the other hand to the saprophytic Saprolegniaceae, which are mostly aquatic and grow on the surface of diseased or dead fish and decaying plants or insects. A fly affected with the fungus presents an appearance very characteristic and well known. It may attract attention while in flight by sluggish movements and while at rest by the distended abdomen. More commonly the insect, with abdomen still more distended and ringed black and white, is found dead on a window pane, wall, or curtain, attached by its proboscis in a life-like attitude, and associated with a dusty-white zonal marking (Fig. 2).

On closer inspection by the microscope (which may be easily accomplished by placing a diseased fly on a glass slide and leaving it for some hours) it will be seen that the dusty-white zonal marking is due to a deposit of spores or conidia. The fly itself shows a whitish fungal growth distending the abdomen and protruding between the black chitinous segmental plates, thus giving rise to the black and white ringed appearance. The fungal ring takes the form of a serried rank of conidiophores, each forming, or bearing, or having parted with, a terminal conidium or spore (Fig. 3). The conidia are dome-shaped, and on reaching maturity are shot off to varying distances around the fly. This ejectment may be viewed under the microscope by placing an affected fly in a Petri dish, and may be likened to a microscopic bombardment, the conidia being easily seen as they flash across the field or alight upon the glass. They adhere at once to the glass, and do not trundle about; hence the comparative uniformity of the zone on a vertical surface. They may be projected to a distance of an inch and a quarter from the fly.

The manner in which the fungus gains an entrance to the body of the fly—in other words the mode of infection—is not definitely known. It is usually stated as occurring in the manner described by Brefeld (1871): the germination of a spore which has become attached to the surface of the insect and the penetration of the resulting hyphal tube through the body wall. In the flies which I have examined there has been no microscopical evidence in support of this view as regards the abdominal and thoracic walls. The fungus permeates the entire body, even the legs and antennae, but in doing so it has always presented certain definite characteristics of localization and form. Thus the muscular system is invaded by long hyphal filaments extending between and within the muscle fibres, and the invasion may be traced in the whole length of the cephalic muscles from the proboscis to the occiput, in the great mass of thoracic muscles (Fig. 5), and down into the muscles of the legs (Fig. 6). In the case of the ventriculus or stomach, which lies in close contact with the thoracic muscles, the fungus also follows the direction of the muscular fibres, and so envelops and permeates the wall of the viscus in a circular manner (Fig. 4). The abdominal cavity (Fig. 7) and also the space forming the posterior portion of the head are entirely occupied by the fungus. The hyphal filaments are more or less intertwined or felted in the latter two regions, and exhibit a stage of vegetative reproduction in the formation of globular bodies or gemmae, which in turn germinate into ramifying hyphae (Figs. 10, 11, 12). These gemmae, it appears, are formed by certain fungi, where conditions of environment are unfavourable to the production of the more specialized spore bodies. In the abdomen the hyphae assume a close parallel arrangement in contact with portions of the intestinal wall, pointing towards the viscus. This is also noticeable in connexion with segments of the crop, but in a lesser degree, and is frequently absent in the sections. At other segments of the crop and portions of the intestine, the fungus is applied to the walls so as to suggest growth from within outwards, but this received no confirmation from the existence of any growing fungal hyphae within these viscera. The hyphae appear to seek the path of least resistance towards the free surface of the body (or the lumen of the intestine), gradually swelling into thick clublike processes containing a row of nuclei. Approaching the intersegmental spaces they pierce the delicate membrane to develop into erect, closely packed, aërial processes—the conidiophores (Fig. 8). In thin sections stained with Loeffler's methylene blue the conidiophores show all the stages in the formation of the conidium, from a bud-like constriction of the apical region to the complete dome-shaped body (Fig. 9). In several flies the intestine was penetrated by the hyphae, but only in one instance did conidiophores bearing conidia appear within the tube. As a rule, the ends of the hyphae which had invaded the intestine presented a digested appearance.

DESCRIPTION OF SPECIAL PLATE.

Fig. 1.—Portion of ribbon-shaped fly paper which had been exposed for twenty-four hours. Four of the flies present the characteristic black and white swollen abdomen due to *Empusa muscae*.

Fig. 2.—White nebular zone formed on glass by conidia projected from the surface of the abdomen of a diseased fly. The abdomen was fixed proximal end downwards in the centre of a Petri capsule. The white wing-like centre is a denser accumulation of conidia on either side of, and close to, the abdomen.

Fig. 4.—The ventriculus of *M. domestica* passing into the abdomen on the right. The wall of the viscus is surrounded and invaded by hyphal filaments. Longitudinal sagittal section. × 125.

Fig. 6.—Leg of *M. domestica* in oblique section, showing the hyphae of *Empusa muscae* among the muscles. × 125.

Fig. 7.—Longitudinal (slightly dorso-lateral) section of abdomen of *M. domestica*, showing *Empusa muscae* developing throughout cavity and erupting through the delicate membrane stretched between the chitinous plates in the form of conidiophores. × 28.

Fig. 8.—Eruption of hyphae through intersegmental membrane with the development of conidiophores and the formation of terminal conidia. × 125.

Fig. 9.—The dome-shaped terminal conidia. Various stages from the commencing bud to the ripe conidium are seen. × 500. (See Fig. 14.)

Fig. 12.—Gemmae of *Empusa muscae* from abdomen of *M. domestica* sprouting and developing into hyphae. Two condidia appear in the field, one in the right and one in the left, affording a contrast between the two kinds of reproductive elements. × 250.

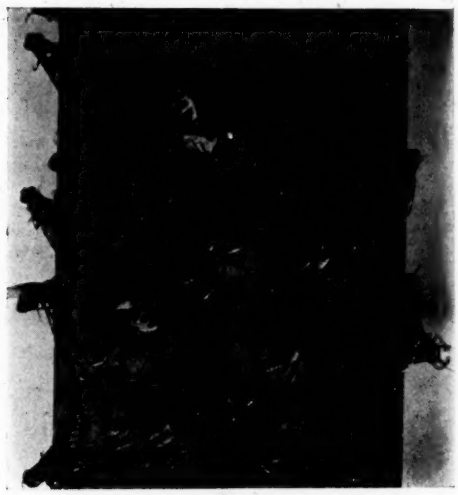


FIG. 1.

FIG. 2.

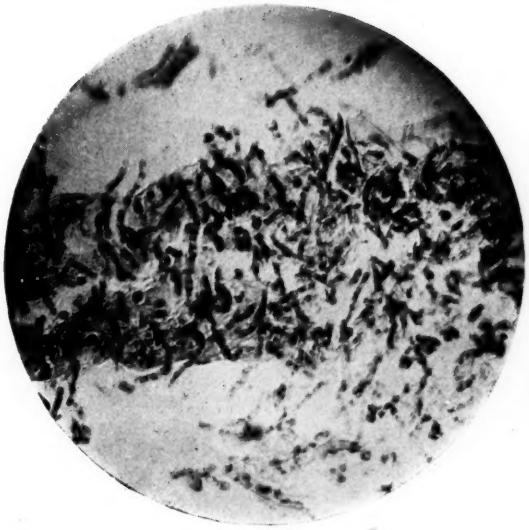
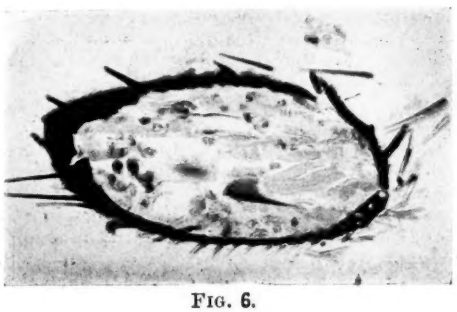


FIG. 4.



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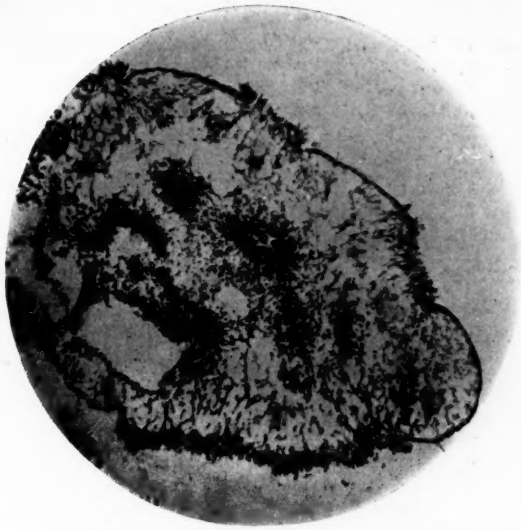

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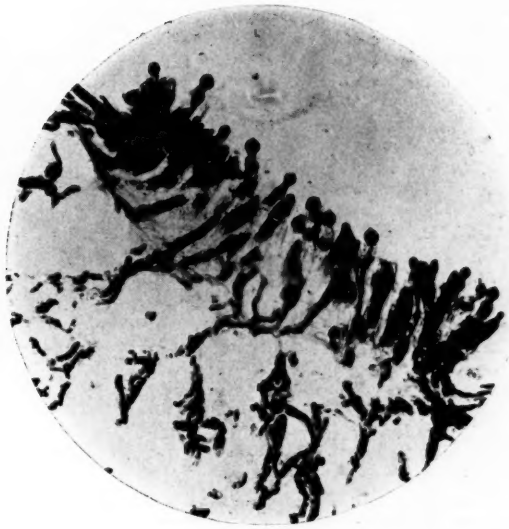

FIG. 8.

FIG. 9.

FIG. 12.

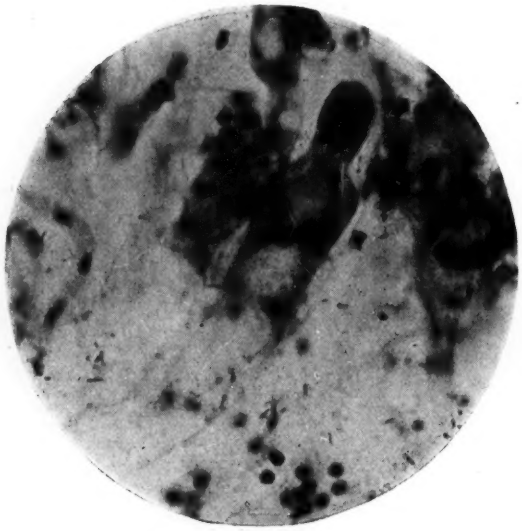

FIG. 14.

FIG. 18.

FIG. 15.

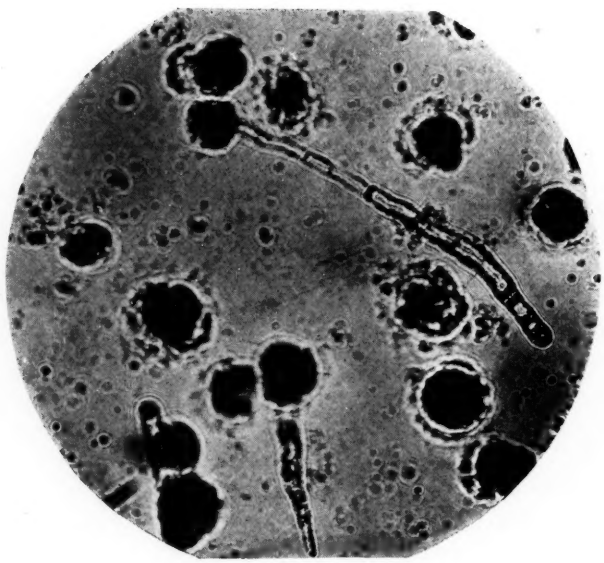

FIG. 20.

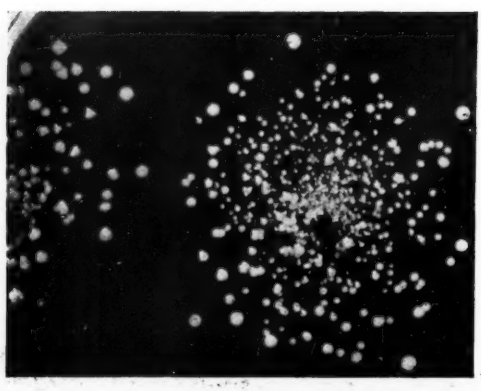

FIG. 16.

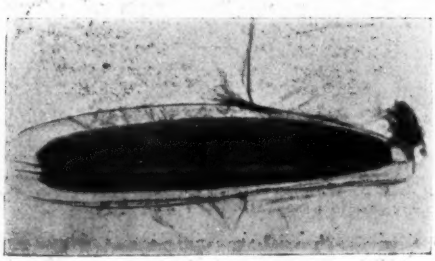

FIG. 17.

FIG. 21.

The majority of the flies presented great numbers of bacteria in the intestines, and amongst the hyphae of

Fig. 13.—Bacteria amongst the hyphal filaments in the abdomen of *M. domestica*. × 1,000.

the abdominal cavity they were widely distributed (Fig. 13), spreading towards the abdominal wall. In Fig. 14 they are seen amongst the conidiophores.

The manner in which the *Empusa muscae* persists from year to year is not known. The formation of resting spores would serve to explain this hiatus in the life-history of the fungus, but the existence of such bodies has not yet been definitely determined. On the other hand, a probable means of persistence from season to season has presented itself in the course of these investigations. It was found in the examination of the eggs from a diseased fly that some of the mycelium remained firmly attached to the outer covering or chorion (Figs. 17, 19). When the eggs are viewed *in situ* in the body of the affected fly they appear in a feltwork of mycelial threads closely applied to the chorion but not penetrating it (Fig. 18). The deposit of eggs by a fly harbouring the fungus thus renders it extremely likely that the larvae would in turn become infected. It is even probable that during the epidemic period of the disease this may be a means of transmitting the parasite from generation to generation of flies. A somewhat analogous method of continuing the species occurs in the life-history of the potato disease fungus, *Phytophthora infestans*. Some of the mycelium passing into the tubers remains in a resting condition, and by this means, without the intervention of spores, the disease can be transmitted from one generation of the plant to another (Massee).

It may be mentioned that the strikingly uniform invasion of the tissues of the diseased imago would be consistent with infection at an earlier stage in its life-history.

DESCRIPTION OF SPECIAL PLATE.

Fig. 14.—Bacteria amongst the hyphae at the surface of the abdomen. (A conidiophore shows the nuclei passing into the terminal bud preparatory to the formation of a conidium.) Longitudinal section of abdomen. × 1,000.

Fig. 15.—Colonies of bacteria (chiefly coliform bacilli) arising from organisms carried by the projected conidia of *Empusa muscae*. A diseased fly was fixed head downwards on agar in a Petri capsule. The colonies are disposed around the fly and coextend with the range of the conidia, which may be seen forming a nebular white zone on the agar surface.

Fig. 16.—A similar experiment to that illustrated by Fig. 15, but showing the type of growth mostly obtained. Two diseased flies were fixed on the plate in this instance, one at the centre and one at the side.

Fig. 17.—Egg of *M. domestica* separated from the felted abdominal mass, and bearing mycelium firmly attached to the outer covering or chorion. × 57.

Fig. 18.—Longitudinal section of *M. domestica* showing eggs *in situ* and their envelopment by the fungus. × 75.

Fig. 20.—Conidia of *Empusa muscae* showered on glucose-agar from a diseased fly. Development of hyphal filaments from one of two conidia which happen to be contiguous. × 150.

Fig. 21.—Active growth of hyphae from conidia projected from fly upon glucose-agar. The thickened septate hyphal development in the left of the field suggests the formation of a third reproductive element. × 250. (See Fig. 12.)

TESTS FOR BACTERIAL DISSEMINATION BY THE FUNGAL SPORES.

The flies were obtained, as already indicated, by hanging up sticky papers in the form of a ribbon about 30 in. long. The papers were exposed for twenty-four hours, and collected by placing them edgeways in slots in long cardboard boxes of just requisite depth. Flies showing the disease began to appear in the middle of August, and continued through September and October; in November they were only in evidence twice. In proportion to apparently sound flies their number was small. The fungus showed itself almost entirely in *Musca domestica*; only two flies of the species *Fannia canicularis* were discovered with it.

In view of the eruption of the fungus from the interior of the fly and the relatively wide range of the conidia, a test was made to determine whether the conidia in their outward flight carried bacteria from the fly to the surface upon which they were projected. For this purpose a diseased fly was fixed head downwards upon nutritive agar in the centre of a Petri plate. In the course of a few days a zone of colonies appeared around the fly within the area bestrewn by the conidia (Figs. 15, 16). It was also observed (under the microscope) that colonies developed along the margins of certain fungal filaments that grow outwards in the medium from the fly's body. Ten flies were dealt with in this way, with the uniform result of producing a zonal crop of colonies. Taking the first five plated for more detailed examination it was found that the colonies numbered from 70 to 400, and that their distribution was well within the furthest range of the conidia. By the usual fermentation tests the colonies were proved to be almost entirely representative of groups in the colon family, as shown in the accompanying table. One fly supplied four types of coliform bacilli;

Fly.	Date.	Number of Colonies.	Groups of Coliform Bacilli Represented in Colonies.
1	Sept. 5th, 1912	400	*Bacillus lactis aerogenes* (Escherich).
2	Sept. 17th, 1912	107	*Bacillus neapolitanus*.
3	Oct. 2nd, 1912	350	*Bacillus neapolitanus*. *Bacillus proteus*.
4	Sept. 14th, 1912	Overgrown by *B. proteus* (uncountable)	*Bacillus pneumoniae*. *Bacillus coli communis*. *Bacillus proteus*. Bacillus No. 19 of Morgan.
5	Oct. 11th, 1912	70	*Bacillus enteritidis* (Gaertner). *Bacillus proteus*.

Fig. 19.—Four eggs of *M. domestica* separated by teasing from fungal mass in abdomen and showing network of hyphae firmly attached to the outer covering or chorion. × 100.

two gave two each, and two one each. These results are representative in some measure of the intestinal flora

of the house-fly as found by Graham-Smith (1909), Orr (1910), Nicoll (1911). It is noteworthy that they are also representative of bacteria which may be found in the human intestine, as was coincidently demonstrated in the laboratory in the course of the examination of the excreta of infants suffering from diarrhoea.

In fly No. 4 there was also a golden yellow coccus in large number, but non-liquefying and non-virulent.

CULTURE OF THE FUNGUS.

Attempts were made on various media to establish artificial growth of the fungus, but while these resulted in an abundant germination of the conidia and the production of characteristic hyphae of considerable length (Fig. 20) development on subcultures was not obtained. The best results were got on glucose agar and on agar to which a small percentage of fat was added, an experiment suggested by the view put forward by some writers that the fungus spreads in the insect from the fat body.

It is perhaps worthy of special note that zo mination was frequently observed from a conidium which was in contact with another conidium. In the plate having glucose agar a condition suggesting the formation of zygospores was manifested (Fig. 21).

Since these observations were made I learnt a few days ago from an editorial note in the BRITISH MEDICAL JOURNAL of January 4th that Dr. H. de Reimer Morgan, of the Lister Institute, had succeeded in obtaining an artificial cultivation of the fungus. Attention is also directed in the same note to the fact that another observer (Mr. Edgar Hesse of London) had obtained what he believed to be a culture of the organism. This was confirmed by Dr. Julius Bernstein, who has been engaged for some time in the investigation of the subject on behalf of the Local Government Board. Mr. Hesse placed his results on record in the *English Mechanic and World of Science* for July 12th, 1912, and by further experiments it appears that he also succeeded in killing flies by feeding them on food containing spores derived from one of his own artificial cultures. He believes that *Empusa muscae* is polymorphic, and by nature a saprophyte endowed with the capacity of living a parasitic existence. Mr. Hesse's experiments lend support to the view that the fungus gains entrance to the body of the fly by way of the alimentary canal.

SUMMARY.

The part played by the house-fly as a carrier of infective bacteria is not yet fully appreciated and is far from being fully known.

The alimentary canal of the insect rather than the surface of its body appears to play the more important part in the transmission of infection.

Empusa muscae proves to be a potential means of bacterial dissemination not hitherto recognized.

The fungus is probably spread from one generation of flies to another by their larvae.

The suggestion of using this natural enemy of house-flies as a means of their reduction or extermination is to be regarded as an expedient of doubtful value, inasmuch as it would be attended by the risk of spreading at the same time bacterial infection to man.

BIBLIOGRAPHY.

Bacot, A. W. (1911): The Persistence of *Bacillus pyocyaneus* in Pupae and Imagines of *Musca domestica* raised from Larvae Experimentally Infected with the Bacillus. *Parasitology*, iv, 63.

Bernstein, Julius (1910): Summary of Literature Relating to the Bionomics of the Parasitic Fungus of Flies, *Empusa muscae* (Cohn), with Special Reference to the Economic Aspect. Local Government Board Report, New Series, No. 40.

Brefeld (1871): Unters. über d. Entwicklung d. *Empusa muscae* und *E. radicans*. *Abh. d. Naturf. Ges. zu Halle*, Band xii.

Buchanan, R. M. (1907): The Carriage of Infection by Flies, *Lancet*, ii, 216–18.

Faichnie, N. (1909): Fly-Borne Enteric Fever: The Source of Infection. *Journ. Roy. Army Med. Corps.*, xiii, 580.

Faichnie, N. (1909): *Bacillus Typhosus* in Flies. *Journ. Roy. Army Med. Corps*, xiii, 672.

Ficker, M. (1903): Typhus und Fliegen. *Arch. f. Hygiene*, xlvi, 274.

Graham-Smith, G. S. (1909): Preliminary Note on Examinations of Flies for the Presence of *Bacillus Coli*. Local Government Board Report, New Series, No. 16.

Graham-Smith, G. S. (1910): Observations on the Ways in which Artificially-infected Flies (*Musca domestica*) carry and distribute Pathogenic and other Bacteria. Local Government Board Report, New Series, No. 40.

Graham-Smith, G. S. (1911): Further Observations on the Ways in which Artificially-infected Flies (*Musca domestica* and *Calliphora erythrocephala*) carry and distribute Pathogenic and other Bacteria. Local Government Board Report, New Series, No. 53.

Graham-Smith, G. S. (1911): Some Observations on the Anatomy and Function of the Oral Sucker of the Blow-fly (*Calliphora erythrocephala*). *Journ. of Hyg.*, xi, 390–408.

Hamilton, A. (1903): *Journ Amer. Med. Assoc.*, February 28th.

Hewitt, C. G. (1910): *The House Fly (Musca domestica)*. A Study of its Structure, Development, Bionomics, and Economy. Manchester: The Univeraity Press.

Howard (1912): *The House Fly. Disease Carrier*. An Account of its Dangerous Activities and of the Means of Destroying It. London: John Murray.

Ledingham, J. C. G. (1911): On the Survival of Specific Micro-organisms in Pupae and Imagines of *Musca domestica*, raised from Experimentally-infected Larvae. Experiments with *B. typhosus*. *Journ. of Hyg.*, xi, 333–340.

Lafar (1904–1907): *Handbuch der technischen Mykologie*. Bd. i.

Morgan, H. de R. (1911): The Differentiation of the Mannite Fermenting Group of *B. dysenteriae*, with Special Reference to Strains Isolated from Various Sources in this Country. *Journ. of Hyg.*, xi, 1–23.

Massee (1906): *A Textbook of Fungi*.

Nicoll, William (1911): On the Varieties of *B. coli* associated with the House Fly (*Musca domestica*). *Journ. of Hyg.*, xi, 381–389.

Nash, J. T. C. (1909): House-flies as Carriers of Disease. *Journ. of Hyg.*, ix, 141–169.

Newstead, Robert (1907): Preliminary Report on the Habits, Life-Cycle, and Breeding Places of the Common House-fly (*Musca domestica*, Lin.), as observed in the City of Liverpool, with Suggestions as to Best Means of Checking its Increase. C. Tinling and Co., Liverpool.

Odlum, W. H. (1908): Are Flies the Cause of Enteric Fever? *Journ. Roy. Army Med. Corps*, x, 528.

Orr, Thomas (1910–11): Report on an Investigation into the Presence of Certain Intestinal Bacteria in the Faecal Excreta of Infants. Local Government Board Report, 374–386.

Tavel (1892): *Morphologie du Pilze*.

Strassburger (1908): *A Textbook of Botany*. Third English edition revised, with the eighth German edition, by Lang.

DISCUSSION.

DR. S. M. COPEMAN desired to congratulate Dr. Buchanan on the interest and value of his research work on the parasitic fungus of the house-fly, as set out in his paper; and on the excellence of the series of lantern slides, mainly of his microscopical preparations. As one result of the investigation on house-flies as carriers of infection that had been carried out during the past few years by the Local Government Board evidence had been obtained that flies could be infected with *Empusa* by way of the alimentary canal; and indeed it seemed not improbable that this, rather than infection from the exterior, was what usually occurred in nature. On the hypothesis generally accepted it was difficult to understand how any really extensive infection could be brought about. The fact that, as Dr. Buchanan had observed, conidia were formed immediately the fungal hyphae reached the exterior of the fly, whereas they were only found exceptionally in the crop or intestine, merely indicated that the fungus was markedly aërtropic, and did not in any way render it improbable that infection originated by way of the alimentary canal. Moreover, the further observation of Dr. Buchanan that bacteria of the *coli* group accompanied the hyphal growth, and might even be thrown off from the exterior of the fly, along with the conidia, seemed to indicate that the growth must have commenced from within the walls of the intestine. The fact that hyphal filaments had been found on the exterior of eggs within the ovary could hardly be of practical importance in reference to carriage of infection, seeing that it was improbable that these eggs would ever be laid. As regards attempts at cultivation of the fungus in artificial media, these had all failed hitherto. Morgan had indeed claimed, in a letter to the JOURNAL, to have been successful; but Mr. Massee, of Kew Gardens, who examined his preparations, did not find any *Empusa* growth in the subcultures. Under these circumstances, other methods, such as the slow burning of pyrethrum powder, must for the present, at any rate, be depended on for the destruction of such flies as obtained access to dwellings. But the ideal was the removal of all facilities for the breeding of flies.

DR. BERNSTEIN expressed pleasure at being present to see the remarkable series of pictures shown by Dr. Buchanan, and stated that one of his initial difficulties in starting to work with the fungus was the absence of any illustrations. In conjunction with Mr. Hesse he had been working at the *Empusa muscae* on behalf of the Local Government Board in order to verify the statement of Mr. Hesse that the fungus could be given artificially and used for inoculating flies. This work would be published later after presentation of the report to the Board. But he felt inclined to agree with Dr. Buchanan that it would be more satisfactory to prevent the growth of flies by destroying their breeding grounds than to await to kill them in later life; though perhaps in dealing with other pests such as the cinch bug and the locust the knowledge might prove of greater value.

TWO CASES OF PARATYPHOID B INFECTION TREATED WITH VACCINE.

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THE paratyphoid B bacillus appears to produce two sets of symptoms. By far the most common is an illness clinically indistinguishable from ordinary typhoid fever. Much less commonly it causes acute gastro-enteritis.

Both the following cases occurred in the practice of Dr. Garratt, of Kingstown, to whom I am very much indebted for allowing me to report them. I desire also to express my obligations to Professor E. J. McWeeney and to Dr. H. F. Moore (Research Scholar) for the cultural and serological diagnosis of the two organisms isolated.

CASE I.

An elderly gentleman, aged 65, was taken ill on Thursday, January 16th. He had a history of attacks of pain in the abdomen and diarrhoea whenever he got a chill. For six weeks previously he had been suffering from swollen and inflamed gums with mucous patches. When seen by Dr. Garratt his temperature was 101°, pulse 96, respirations 20. He had pain in the region of the umbilicus and was having twelve to fourteen diarrhoeal motions in the twenty-four hours. He was given 10 grains of tannalbin every hour and ½ grain of opium with 6 grains of tannigen twice daily, and starch and opium enemata. The next day (17th) his temperature was 102°, his tongue was dry and heavily coated, and the stomatitis had spread over the soft palate and into the pharynx, making swallowing difficult. His abdomen was distended, and there was exaggerated gurgling through the ileo-caecal valve.

On January 18th his temperature was 102.8°; still twelve to fourteen motions a day. He continued t grow weaker. He was at times delirious and his heart was intermitting. On the 21st I saw him with Dr. Garratt. I made cultures from the pockets round his teeth, and also from his stools. I suggested the use of a germicide pending the making of a vaccine, and 1 c.cm. of iodine-menthol-radium compound was given into the gluteal muscles. That evening his temperature fell to 99.2° and the diarrhoea was less.

The next day (22nd) 1 c.cm. of iodine-menthol-radium compound was given, and the evening temperature was 99°. Blood cultures were made but gave no growth. The cultures from the gums gave chiefly streptococci with some *Micrococcus catarrhalis*. On Drigalski plates the faeces gave two kinds of colonies—(1) pink (acid); (2) blue, both Gram-negative motile bacilli. From the pink colonies the bacilli were feebly motile; from the blue they were more actively motile. I gave the Conradi-Drigalski plate to Professor McWeeney for further investigation, and made a mixed vaccine from an agar plate that I had made at the same time. I told Dr. Garratt that the case was most probably one of either typhoid or paratyphoid B fever. The blue colonies proved to be paratyphoid B. The vaccine was ready on the 23rd, and 5 million of the mixed vaccine were given on the 24th. His temperature was then 102° F., and he had to have 120 minims of chlorodyne, and starch and opium enemata, which kept down the motions to six to seven a day. He was delirious at times. That night he had the best night since the beginning of his illness, and the next day his temperature had fallen to 99° F. He felt better and was not delirious. His temperature was normal from this on, and instead of diarrhoea he became constipated, and enemata were necessary, which were probably the cause of an erythematous rash which came out on February 3rd. He had 7½ million of vaccine on January 28th, and was so much better on February 2nd that he was given solid food. He had 10 million on February 4th, and 15 million on February 11th. On February 22nd he had 20 million of the coli-paratyphoid vaccine, and 2½ million of streptococcal vaccine made from his gums as they were still a little sore. On March 1st he had 50 and 5 million, and on March 8th 70 and 10. His gums were then healed.

CASE II.

Male, aged 18, was seen by Dr. Garratt when he was, from his history, apparently at the beginning of the third week of what was clinically typical typhoid fever. The patient was semiconscious, restless, and sleepless. His abdomen was distended, there were a few rose spots on it, and Ire was tender in the region of the caecum. He was constipated, and his mouth and tongue were typically typhoid. He was refusing food. His temperature was 103° F. and his pulse was 110. Widal negative. As in the last case, cultures on Conradi-Drigalski from his stools gave red and blue colonies. A mixed vaccine was made. He was given 2½ million on March 9th. That night he was very weak and restless, and was given a saline enema and stimulants. The next morning his temperature was 97° F., his pulse 65. His flatulence was relieved, tongue clean, and sordes cleared up, and delirium had disappeared.

On the following night (March 11th) his temperature went to 100° F., but his pulse was only 65, and his temperature kept entirely normal from that on. He was put on to more solid food in a day or two, and made an uninterrupted recovery, and was given full diet on the 19th. On March 17th he had 5 million of the vaccine, and had no reaction after it.

Comment.

When I first saw Case I I thought it was probably one of acute gastro-enteritis, most likely produced by a mixed infection with streptococci from the gums and coliform organisms in the intestines, which, in my opinion, is the most common cause of inflammations of the gastro-intestinal tract and its adnexa. The iodine-menthol-radium compound seemed to produce a temporary improvement, but the patient relapsed, and his condition on the 24th, when he got the vaccine, was most precarious. The change in a few hours, after the injection, from a temperature of 102°, an intermittent pulse, a distended abdomen, delirium and diarrhoea hardly controlled, to a condition of temperature nearly normal, steady pulse, no distension and feeling of comparative well-being, was most remarkable and dramatic. The same may be said of Case II, whose condition at the time he got the vaccine—namely, temperature 102°, pulse 110, weak, and of small tension, delirious, with distended abdomen. Twenty-four hours after he is quite conscious, his abdomen is no longer distended, his pulse is 68 and of good tension, and his temperature is normal.

I can find little reference in the literature to the treatment of paratyphoid by means of vaccine, but there is a pretty extensive literature of vaccine therapy of typhoid fever, which, according to most authorities, is clinically indistinguishable from paratyphoid. I cannot find anything comparable to the sudden turn from severe illness to convalescence which occurred in these cases, and suggest that it may have been due to the use of the mixed vaccine, for in all these cases the *B. coli* must always be also pathogenic, since it becomes so at the slightest lowering of the resistance of the cells with which it comes in contact.* These cases are in marked contrast to the two fatal cases of paratyphoid referred to below.

Manufacture of Vaccine.

Since both of these cases were in a precarious condition, it was essential to get the vaccine made in as short a time as possible. The faecal material was plated out on an ordinary agar and on Conradi-Drigalski medium, and broth cultures were made. As I have said, on the Conradi-Drigalski medium two kinds of colonies appeared, the larger were red, the smaller blue. The larger were feebly motile, the smaller more actively motile. It was presumed that the microbes belonged to the typhoid-coli group, the red colonies belonging to the coli side, the blue to the typhoid side of the group.

The cultures were made in the afternoon, examined the next morning, and a mixed vaccine made from the agar plates. I prefer, if possible, to sterilize vaccines with as little heat as possible. As a rule, in making typhoid vaccine I do not heat at all, but allow the ½ per cent. phenol to kill the microbes, or, if in a hurry, take some of the suspension and heat it for fifteen minutes with the ½ per cent. phenol saline solution, and use it for the first dose or two. It takes a very long time to kill *coli* organisms this way; even half an hour at 58° C. frequently fails to kill them all, and so in these cases I heated them for forty-five minutes at 58° C. They were then tested, and the agar cultures made being sterile after twenty-four hours, doses were measured out. It is thus possible to have the vaccine ready within forty-eight hours. (The Conradi-Drigalski plates were then handed over to Professor McWeeney and Dr. Moore for exact diagnosis.) The diagnosis that the blue colonies were paratyphoid B organisms was arrived at by their cultural and serological reactions, which were compared with those of other paratyphoid organisms and with those of other members of the typho-coli group. Taking the cultural reactions first, it will appear from the accompanying table (p. 1374) that they behaved as typical paratyphoid B organisms.

*Sanarelli has proved the increased toxicity of the colon bacillus in typhoid fever.

TABLE I.

	Arabinose.	Dulcite.	Glucose.	Inulin.	Lactose.	Maltose.	Mannite.	Raffinose.	Saccharose.	Salicin.	Xylose.
1. Faecal coli	G. A.	G. A. R.	G. A.	A.	G. A.	G. A.	G. A. R.	G. A.	G. A. R.	G. A.	G. A.
2. Typhoid	—	A. R.	A.	— R.	—	A. R.	A. R.	A.	— R.	— R.	— R.
3. Gaertner	G. A.	G. A. R.	G. A.	A. R.	—	G. A. R.	G. A. R.	A. R.	— R.	— R.	G. A. R.
4. P.B., Redmond ...	G. A.	G. A. R.	G. A.	A. R.	—	G. A. R.	G. A. R.	A. R.	— R.	— R.	G. A. R.
5. P.B., R.A.M.College	G. A.	G. A. R.	G. A.	— R.	—	G. A.	G. A.	A. R.	— R.	A. R.	G. A. R.
6. Crofton I	G. A.	G. A. R.	G. A.	— R.	— R.	G. A.	G, A.	A. R.	— R.	— R.	G. A.
7. Crofton II	G. A.	G. A. R.	G. A.	— R.	— R.	G. A,	G. A.	— R.	— R.	— R.	
8. P.B., Malta	G. A.	G. A.	G. A.	— R.	— R.	G. A.	G. A.	— R.	— R.	—	
9. P.A., R.A.M.College	G. A.	G. A.	G. A.	—	—	G. A.	G. A.	—	—	—	
10. Murray	A.	A. R.	G. A.	— R.	—	G. A.	G. A.	—	— R.	A.	
11. Sligo	G. A.	—	G. A.	—	G. A.	G. A.	G. A.	—	— R.	G. A.	

G. = Gas. A. = Acid. R. = Reduction of litmus colour.

Comments.

1. This strain of faecal coli is not classically typical, because it forms gas and acid on saccharose.

2. Typhoid, an old strain (ten years), behaves typically on these sugars.

3. "Gaertner" was isolated by Professor McWeeney from a meat poisoning epidemic in Limerick. It was, and still is, very virulent. It produced nine deaths in the original epidemic.

4. "P.B., Redmond." From a *fatal* case of supposed typhoid fever in the Mater Misericordiae Hospital, Dublin. The organism was isolated from the intestinal contents. The alimentary canal from and including the stomach downwards was found at the autopsy to be swarming with paratyphoid B bacilli. There were ulcers of a typhoid character round the ileo-caecal valve. This strain differs from the other paratyphoids in forming acid in inulin. It agrees with (5) and (6) in forming acid in raffinose, while (7), (8), and (10) do not.

5. A strain obtained from the Royal Army Medical College. It agrees with Redmond and Crofton I in forming acid in raffinose. It also forms acid in salicin.

6. Was isolated from the acute diarrhoea case described above. Its only cultural difference from the strain obtained from Case II is in its forming acid in raffinose. This latter strain may be termed "Crofton II." It is No. 7 on this list.

8. "P.B., Malta" was obtained from the Royal Army Medical College, and agrees with Crofton II in not forming acid in raffinose.

9. "P.A." was also obtained from the Royal Army Medical College. It differs from the other paratyphoids in not discharging the litmus colour in the media containing inulin, lactose, raffinose, saccharose, and salicin. Its main difference, of course, is its inability to alter neutral red and its behaviour on litmus whey.

10. "P.B., Murray" was isolated from the faeces of a patient whose illness was complicated by peritonitis from which a staphylococcus was isolated *post mortem*. Its sugar reactions are atypical, since it forms no gas in arabinose and dulcite and forms acid in salicin like (5) "P.B., R.A.M.College."

11. "Sligo" was isolated from the faeces of patients from an epidemic of illness, attributed to the ingestion of abnormal milk, in Sligo Workhouse. The blood of the patients did not give sufficient agglutination to connect the microbe with the disease. From its cultural reactions it appears to be an atypical *coli*.

By Erhlich's method none of these microbes gave indol except *Bacillus coli*. Loeffler's new plate medium and green solutions, while it distinguished typhoid from coli, paratyphoid A, paratyphoid B, and the other food poisoners, did not distinguish the food poisoners from each other. The same may be said of Buchholtz neutral red medium.

TABLE II.—*Agglutination Experiment.*

Serum.	Crofton I.	Crofton II.	Murray.	Redmond.	Malta.	P.A.	Aertryck.	Gaertner.	Coli.	Typhoid.
Anti-Crofton I	50,000	50,000	40,000	40,000	5,000	20	50	10	10	20
Anti-Crofton II	60,000	70,000	50,000	30,000	30,000	100	50	100	20	50
Anti-Gaertner	100	50	100	100	100	100	—	10,000	0	100
Anti-P.A....	500	500	500	1,000	500	30,000	—	50	0	100
Anti-typhoid	500	500	1,000	500	500	100	—	1,000	500	30,000
Anti-Aertryck	10	16	20	16	20	50	10,000	20 (?)	100	20

Comments.

1. Anti-Crofton I serum was obtained from a rabbit by intravenous injections of a killed suspension. Five injections at six days' intervals were given, when the serum was drawn off to test. Another injection was given fourteen days later. The animal rapidly became ill and died in about two days after this injection. Cultures from heart's blood and spleen gave no growth, the vaccine was proved sterile, and the serum had *post mortem* lost all its agglutinating power. (For these reasons we are inclined to think it died from anaphylaxis.) On account of this its agglutinating effect on Crofton II and Malta could not be verified.

2. Anti-Crofton II serum was prepared in the same way.

3. Anti-Gaertner serum. This was obtained from the Lister Institute, our own efforts to obtain an antiserum having failed, owing to the extreme toxicity of the killed cultures, which were derived from the Limerick epidemic.

4. Anti-P.A. serum was also obtained from this source.

5. Antityphoid serum was obtained from Messrs. Burroughs, Wellcome and Co.

6. Anti-Aertryck was made by giving four injections of killed suspensions subcutaneously. This immunization was carried out by the subcutaneous instead of the intravenous method, owing to the extreme toxicity of the killed microbes—two rabbits having died after the first *intravenous* injection.

Controls were done in every series of tests by using normal rabbit serum instead of the specific agglutinating serum. The microscopic method was used, and was controlled in many instances by Wright's macroscopic technique. It is interesting to note that in none of these experiments was a zone of inhibition experienced.

Anti-Crofton I and II did not agglutinate Aertryck in high dilution.

The only further comment necessary is that the figures as set forth in Table II clear up the diagnosis of the group to which the microbe isolated from Murray belongs, since the sugar reactions left this in doubt. The figures make it abundantly

evident that it is a paratyphoid B. organism, and yet it does not ferment dulcite.

The identity of these microbes—namely, Crofton I and II—was further confirmed by a few absorption experiments.

TABLE III.—*Absorption Experiment.*

Anti-*paratyphosus* A serum saturated with Murray (lowest dilution examined 1 in 50).

	Crofton I.	Crofton II.	Murray.	Redmond.	Typhosus.	P.A.
Titre before absorption...	500	500	500	1,000	100	30,000
Titre after absorption ...	0	0	0	0	50	10,000

This further tends to confirm the identity of Murray with Crofton I, Crofton II, and Redmond.

The anti-P.A. serum used in this case was obtained by us in similar manner to the antiserums to Crofton I and II.

TABLE IV.—*Absorption Experiment.*

Anti-Crofton II serum saturated with Redmond (lowest dilution examined 1 in 20).

	Crofton I.	Crofton II.	Redmond.	P.A.
Titre before absorption...	60,000	70,000	30,000	100
Titre after absorption ...	0	0	0	100

The typical P.B. microbe (Redmond) has taken all the agglutinins for Crofton I and II from Crofton II serum, again confirming the identity of these microbes.

DISCUSSION.

Dr. C. W. HUTT (Brighton) said that the case of acute gastro-enteritis recorded was of interest to those who were concerned with "diarrhœa," especially from the standpoint of the public health official. The connexion of diarrhœa among infants with *Bacillus paratyphosus* B had been proved, among others, by Drs. Clements and Thomas Orr. The case mentioned by Dr. Braxton Hicks was also of interest in this connexion. If the association of *Bacillus typhosus* and *Bacillus paratyphosus* B was more common than was usually held, it was possible that the cases of diarrhœa among children, shown by Dr. Niven ,by means of Widal reactions to be overlooked cases of typhoid fever, might also harbour in their intestines the *Bacillus paratyphosus* B. It would be useful to hear of the results of the use of vaccines in cases of diarrhœa among infants and children.

Dr. EYRE pointed out that Conradi-Drigalski medium was most valuable because in a few hours characteristic colonies could be picked out. He mentioned the probability of a mixed vaccine being more satisfactory than a pure vaccine, owing to the exaltation of the *B. coli*. He deprecated the haphazard use of sugar media, and thought it would be better to classify these according to their chemical structure—namely, monosaccharides, disaccharides, etc.—in order to arrive at a better understanding of what these organisms could do. He pointed out that, though some organisms might form acid litmus media might not be discoloured. With regard to vaccines in treatment of diarrhœa in infants, he said that some years ago Minett obtained promising results with Morgan's bacillus No. 1.

Dr. HICKS (London) related two interesting cases in which agglutination reactions had proved of value and in which vaccines had been of great assistance.

Dr. BERNSTEIN (London) pointed out that for the purposes of treatment it was not absolutely essential to exactly place the offending coliform organism, provided that its association with the diseased state was evident. He also suggested the possibility of a spontaneous cure of these infections, which would possibly ultimately wear themselves out, though there could be no doubt of the value of vaccines in such cases.

Professor MCWEENEY, in reply, said that the prognosis in these cases was so bad that it appeared unlikely that their recovery could have been due to spontaneous recovery. He agreed that for purposes of treatment it was sufficient to allocate the isolated microbes to their groups, this giving sufficient guide to initial dose. The cases referred to by Dr. Hicks clearly indicated that mixed autogenous vaccines were essential in the treatment of typhoid and paratyphoid infections. He agreed with Dr. Eyre that the sugar reactions should be grouped according to their chemical composition.

ON THE ACTION OF ASBESTOS ON CERTAIN PHYSIOLOGICAL SUBSTANCES.

BY

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WE have found that solutions or suspensions of certain substances, after being in intimate contact with asbestos for varying periods are altered either in quantity or quality.

The substances were classified as follows:

A. *Ferments:*
1. Malt diastase.
2. Pepsin—liquor pepticus (Benger).
3. Rennet—Benger's preparation.
4. Pancreatic ferments—liquor pancreaticus (Benger).

B. *Carbohydrates:*
1. Starch.
2. Dextrin.
3. Dextrose.

C. *Proteins:*
1. Non-diffusible: egg albumin.
2. Diffusible: peptone (Witte).

D. *Alkaloids:*
1. Curare.
2. Strychnine.

E. *Hormone:*
1. Suprarenin; synthetic.
2. Adrenalin (Parke, Davis and Co.).

Method.—To each gram of asbestos fibre 2 c.cm. of the solution or suspension substance were added. This proportion sufficed to enable the asbestos to soak up all the fluid, leaving no excess. The liquid was recovered from the asbestos by means of pressure exerted by a small hydraulic press. We propose to call the exuded liquid the exudate, and the material which cannot be recovered by pressure the residue material.

A. FERMENTS.

1. *Malt Diastase.*—The malt diastase before being placed in contact with asbestos was very active, rapidly converting starch into sugar. After being in contact with asbestos for twenty-four hours the exudate was quite inactive. The asbestos containing the residual material became activated or sensitized, and rapidly hydrolyzed starch.

2. *Pepsin.*—The undiluted liquor pepticus (Benger) was used. It was in contact with asbestos for four weeks. The exudate was added to swollen fibrin in 0.2 per cent. HCl and maintained at 37° C. No proteolytic action could be detected. The asbestos with its contained residual material was steeped in 10 per cent. egg albumin which had been acidulated with HCl and the whole placed in the incubator at 37° C. On examining the fluid which could now be exuded it was found to be entirely free not only from albumin but also from the products of

peptic digestion. One of the following phenomena had taken place:

(*a*) The albumin was absorbed unchanged, and remained unchanged as residual material.

(*b*) The albumin was absorbed unchanged, became residual material; this residual material was hydrolyzed, and the products of hydrolysis remained as residual material.

(*c*) The albumin was first hydrolyzed, the products of hydrolysis absorbed, becoming residual material.

Further research in the form of fractional analysis will be necessary in order to elucidate this point.

3. *Rennet.*—Benger's undiluted preparation was used and squeezed out from the asbestos after the lapse of four weeks. The exudate contained no milk-curdling ferment. The asbestos has not been satisfactorily examined for residual material on account of the difficulty experienced in determining whether a liquid which cannot be expressed from the interstices of a solid is or is not curdled.

4. *Pancreatic Ferments.*—Benger's undiluted liquor pancreaticus. This preparation contains four ferments—namely, trypsin, amylopsin, steapsin, and a milk-curdling ferment. After being in contact with asbestos for four weeks the exudate was examined, with the following results: 97 per cent. of the trypsin, as estimated by Roaf's method, had disappeared, and no trace of the remaining three ferments could be found.

Fibrous asbestos, with its residual material, was steeped in 0.5 per cent. starch paste, and kept at 37° C. After twenty-four hours—it was not examined before—the exudate contained no starch, no erythrodextrin, but a quantity of reducing sugar, and the asbestos itself gave no reaction with iodine.

An attempt was made to examine the residual material for steapsin and milk-curdling ferment, but the result was negative. With improved technique we hope to obtain a positive result in the near future. It is quite within the bounds of possibility that the several pancreatic ferments may be thus removed fractionally from solution.

B. Carbohydrates.

1. *Starch.*—A 0.5 per cent. starch paste was placed in contact with asbestos, and pressure applied after ninety-six hours. The exudate contained no starch, it contained erythrodextrin and reduced Fehling's solution slightly, but so slightly that we could not exclude the possibility of the reduction being due to the dextrin and not to one of the reducing sugars. This experiment was repeated, it being possible that the asbestos contained some organic ferment. The asbestos was therefore boiled in water, dried and kept at a temperature of 300° C. for several hours. Even after this treatment its catalytic action was unabated. On treating the asbestos with iodine, the characteristic starch reaction was obtained.

Some 0.5 per cent. starch paste was left in contact with asbestos in a sealed bottle for three months at room temperature. On squeezing out, the exudate was free from starch and dextrin, but contained a large amount of reducing sugar, which proved to be glucose, a glucosazone being readily formed. The asbestos gave no reaction with starch, showing that all the starch had been converted into glucose, or achroodextrin and glucose.

2. *Dextrin.*—A 0.5 per cent. solution of pure dextrin was placed in contact with asbestos. After the lapse of twenty-four hours the exudate contained 0.25 per cent. dextrin. On testing the asbestos fibre with iodine the reaction for dextrin was obtained. We quite expect to find, after a long period, that the dextrin which exists as residual material will ultimately be converted into glucose.

3. *Dextrose.*—Dextrose is only slowly and imperfectly removed from solution by means of asbestos.

C. Proteins.

1. *Non-diffusible Egg Albumin.*—Weak solutions or suspensions of egg albumin lose all their contained protein in twenty-four hours when placed in contact with asbestos. The exudate is protein-free, while the asbestos containing the residual material gives the xanthoproteic reaction and reaction with Millon's reagent. The more concentrated the albumin solution the more protein will the exudate contain. It is possible that the residual material contains the products of protein hydrolysis; this we have not yet determined.

2. *Diffusible Protein: Peptone.*—A 0.2 per cent. solution of Witte's peptone was employed; this is a mixture of proteose and peptone, and was always removed quickly from solution, so that the exudate was proteose and peptone free. The biuret reaction was used as an indicator, a standard solution of copper being prepared by adding 1 c.cm. of fresh Fehling's solution to 20 c.cm. of 20 per cent. NaOH, 1 c.cm. of this solution was added to 1 c.cm. of the exudate and the depth of colour compared with a 0.2 per cent. solution of Witte's peptone.

Table showing Removal by Asbestos of Protein from Solutions of Different Concentrations.

Experiments.	Egg Albumin per Cent.	Protein per Cent.	
		Exudate 24 Hours.	Exudate 48 Hours.
1	0.09	Nil	Nil
2	0.1	Nil	—
3	0.15	Nil	—
4	0.19	Trace	Trace
5	0.25	Trace	—
6	0.26	Trace	—
7	0.34	0.1	—
8	0.38	0.1	Trace
9	0.46	0.2	—
10	0.5	0.2	—
11	0.54	0.22	—
12	0.58	0.28	0.15
13	0.64	0.38	—
14	0.72	0.38	—
15	0.78	0.5	0.39
16	0.93	0.68	0.62

Apropos of diffusible proteins we should mention that we have observed some interesting phenomena with regard to the behaviour of asbestos towards the products of peptic and tryptic digestion. We are at present making further investigations.

D. Alkaloids.

1. *Curare.*—A 0.1 per cent. solution of curare in 0.6 per cent. saline was used. After twenty-four hours' contact with asbestos 1 c.cm. of the exudate was injected into the dorsal lymph sac of a frog; the frog showed no symptoms of paralysis.

A frog of similar size was given a 1 c.cm. dose of the original solution. It showed marked paralysis in fifteen minutes, and was dead at the end of an hour. The exudate was also much less deeply pigmented than the original solution.

2. *Strychnine.*—The liquor strychninae, *British Pharmacopoeia*, diluted ten times, was employed. On testing the exudate after twenty-four hours' intimate contact with asbestos no trace of strychnine could be found.

E. Hormone.

1. *Synthetic Suprarenin.*—A 0.0025 per cent. solution in normal saline was in contact with asbestos for twenty-four hours. The exudate contained no pressor principle as gauged by its action on the excised eyeball of the frog.

2. *Adrenalin* (Parke, Davis and Co.).—A solution containing one part in 10,000 parts of normal saline was used. After twenty-four hours the exudate contained no pressor principle.

It is proposed to repeat the experiments with suprarenin and adrenalin, using the colorimetric method for estimation as recently described by Folin, Cannon, and Denis.

The following table shows the solubility of various forms of asbestos and other materials in distilled water. The figures refer to the conductivity of the exudate in reciprocal meghoms cm^{-1}. In each case 50 c.cm. of distilled water were added to 25 grams of material.

	24 Hours.	42 Hours.	90 Hours.	230 Hours.
Asbestos, Russian ...	336	551	756	1,472
Asbestos, Canadian, A.	1,205	1,696	2,204	2,272
Asbestos, Canadian, B.	602	722	851	1,088
Asbestos, African ...	468	630	702	1,056
Glass powder	200	229	254	322
Talc, Austrian	107	121	130	185
Talc, French	98	111	117	160
Kaolin	200	177	172	192
Asbestos powder ...	277	295	310	361
Glass wool	2 770	2,793	3,444	4,216
Fuller's earth	236	244	263	326
Animal charcoal ...	941	886	930	960

When in contact with distilled water, asbestos continually undergoes a degradation or solution; electrolyte is being continually added to the water. This degradation is increased during the disappearance of diffusible substances from solution, and diminished during the adsorption of colloidal substances, such as colloidal gold, dialysed iron and methylene blue. These latter apparently form a protective coating on the asbestos fibre.

The following table shows the increased solubility of asbestos fibre and kaolin during the disappearance of a diffusible substance from solution. The asbestos and the kaolin were steeped in a 0.2 per cent. solution of Witte's peptone:

	Conductivity in Reciprocal Megohms, cm^{-1}.			Biuret Reaction.		
	24 hrs.	48 hrs.	72 hrs.	24 hrs.	48 hrs.	72 hrs.
Distilled water ...	3.2	3.2	3.2	100 %	100 %	100 %
Peptone 0.2 per cent..	102 4	115.8	133.4	—	—	—
Kaolin	107.0	177.0	—	—	—	—
Russian asbestos ...	336.0	551.0	756 0	—	—	—
Kaolin and peptone, 0.2 per cent.	224.0	263 8	288 0	20 %	20 %	20 %
Russian asbestos + peptone 0.2 per cent.	620.8	736.0	851.0	10 %	0 %	10 %

The following table shows the diminished solubility of asbestos in distilled water during the adsorption of colloidal substances:

	Controls.	+ ½ Weight Asbestos.		+ ½ Weight Animal Charcoal.	
		After 15 Minutes.	After 22 Hours.	After 15 Minutes.	After 22 Hours.
Distilled water ...	3.2	317.8	342.4	874	896
Colloidal gold ...	258.8	345.2	530.8	760	760
Dialysed iron, 2 per cent.	501.8	403.2	723.2	102	102
Dialysed iron, 0.7 per cent.	239.6	258'8	934	—	—
Methylene blue, 0.01 per cent.	230.4	134.4	486	716	716

The removal of peptone from solution by asbestos and other materials is shown in the following table:

Materials.	Weight in Grams.	Volume of Solution, 0.2 per Cent. Peptone in c.cms.	Per Cent. of Peptone remaining as judged by the Biuret Reaction.	
			Powders Shaken 8 Hours; Fibres Standing 16 Hours.	Powders Shaken 16 Hours; Fibres Standing 55 Hours.
Asbestos, Tyrolese ...	1	5	2	10
Asbestos, Tyrolese, after treatment with alcohol and other	2.5	5	1	0
Silk	0.85	4.25	60	50
Cotton	1	5	100	60
Scottish wool (long fibre)	1	5	90	0
Merino	1	5	75	Brown
Ramie	1	5	90	10
Flax	0.22	1.2	40	40
Asbestos, Canadian...	1	5	25	0 (?)
,, Russian ...	1	5	27.5	0
,, blue ...	1	5	35	Dirty brown
Glass wool	1	5	100	100
Animal charcoal ...	1	5	0	0
Kaolin	1	5	10	100
Glass powder	1	5	90	90
Talc, Austrian ...	1	5	20	100
,, French	1	5	27.5	95
Asbestos powder ...	1	5	0	0 (?)
Sand (clay present) ...	1	5	50	50
Control (not shaken)			100	100
,, (shaken) ...			100	100

Oscillatory Phenomenon.

We have observed that in a few instances the peptone was first removed from solution and later given up; the figures in the following table refer to the percentage of peptone of original solution remaining. The original solution was 0.2 per cent.

Russian asbestos + 0.2 per cent. peptone	24 hrs. standing, 10 %	48 hrs. standing, 0 %	68 hrs. standing, 10 %
Kaolin powder + 0.2 per cent. peptone	8 hrs. shaking, 10 %	16 hrs. shaking, 100 %	
Tyrolese asbestos + 0.2 per cent. peptone	16 hrs. standing, 2 %	55 hrs. standing, 10 %	
Talc, Austrian, + 0.2 per cent. peptone	8 hrs. shaking, 20 %	16 hrs. shaking, 100 %	
Talc, French, + 0.2 per cent. peptone	8 hrs. shaking, 27.5 %	16 hrs. shaking, 95 %	

The above research is a continuation following on some remarks made by one of us at a meeting of the Pathological Society of Great Britain and Ireland, held at St. Bartholomew's Hospital in January, 1913. The experiments were not performed under conditions of strict sterility.

PROTEOSE-FREE TUBERCULIN.

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(From the Department of Pathology, University of Leeds.)

In the application of old tuberculin for the diagnosis of tuberculous disease a large number of positive reactions are obtained in persons in whom no clinical signs of tuberculosis are found, and who give no history indicative of a tuberculous infection. At the same time a number of tuberculous patients give a negative or slightly positive reaction, from which it is difficult to decide whether the reaction is due to specific toxins existing in the tuberculin, or to substances which are not specific products of the tubercle bacillus.

In a series of experiments, performed with the view of discovering whether any of the ingredients used in the preparation of old tuberculin possess toxic properties, it was found that the medium itself, when used instead of old tuberculin in the manner described by von Pirquet or Woodcock, produced a reaction very similar to that produced by old tuberculin, alike in tuberculous and non-tuberculous subjects. It was further found that a 1 per cent. solution of commercial peptone, containing peptones and proteoses, gave a similar result.

It was inferred from this fact that the proteoses in old

tuberculin are not specific, and that they are toxic is shown by the inflammatory process they induce when applied as a cutaneous test by any of the cutaneous methods. Their presence, moreover, in old tuberculin tends to mask any reaction which might be produced by specific toxins excreted into the culture medium, or derived from the bodies of the bacilli during the process of growth.

Accordingly, it was thought that if these foreign proteoses were removed from old tuberculin a positive reaction would more definitely indicate the presence of tuberculosis.

Koch evidently thought that the presence of these substances were injurious, since he endeavoured to exclude them from tuberculin by growing bacilli on an albumose-free medium containing asparagin, citrates, and inorganic salts. This modification is now known as T.A.F.

Béraneck excludes foreign proteoses from his tuberculin by using for his culture medium a watery extract of veal, obtained by macerating veal in cold water for two hours.

A third method for excluding proteoses from tuberculin was described in a former paper, and consists in growing tubercle bacilli on peptone veal broth in the manner described by Koch, and then adding absolute alcohol to the filtered product to precipitate the proteoses. The supernatant fluid is decanted, and the alcohol evaporated off at a low temperature. The remaining fluid is proteose-free, and contains in solution a toxin which has been shown to be specific to tuberculosis.

Another method, recently described by Coplans, is that in which finely divided asbestos is added to peptone veal broth; the medium is then inoculated with tubercle bacilli, which are allowed to grow until a thick film of growth has formed. The fluid is removed by squeezing the asbestos dry, filtered through porcelain, and 1 per cent. phenol added. When tested by the "biuret" method this fluid is found to be proteose-free, the proteose having been absorbed by the asbestos. It is, however, toxic to tuberculous subjects.

If the proteose derived from tuberculin be dissolved in water and made up to the original bulk with water, and the solution used instead of tuberculin in the manner described by von Pirquet or Woodcock for cutaneous reaction, a positive reaction is obtained in practically every case, whether tuberculous or non-tuberculous. If, after the removal of the alcohol, the supernatant fluid is employed in a similar manner no reaction is obtained in patients in whom no clinical signs of tuberculous disease are found, whereas in persons who are known to have tuberculosis, a positive reaction is obtained in 98 per cent. of cases. Those tuberculous patients who gave a completely negative reaction were very advanced in the disease, and all died within two weeks of the application of the test.

For diagnostic purposes the method which has been principally used is a modification of that advocated by Lignières. This method was chosen on account of its painlessness and the ease with which it can be performed. The following is briefly the method of procedure:

> The skin of the forearm having been cleaned with soap, spirit, or alcohol, sufficient friction being applied to induce a slight hyperaemia, one drop of proteose-free tuberculin is injected from a sterile hypodermic syringe between the epidermis and the Malpighian layers. On withdrawing the needle a little of the injected fluid escapes and is removed on a piece of cotton-wool. As a control, a drop of sterile peptone veal broth, from which the proteose has been removed by precipitation with alcohol, is introduced in the same way a short distance from the site of the first injection, any fluid escaping being removed on cotton-wool. No dressing is required.

At the end of twelve hours the arm is examined. If a positive reaction is produced, an area of hyperaemia is noted around the part into which tuberculin was injected. The hyperaemic area enlarges and becomes more pronounced, until, at the end of twenty-four hours, the complete reaction is produced. The control should be free from hyperaemia.

The reaction, when positive, varies in intensity according to the stage of the disease, but in the inverse ratio; an early case of phthisis, for example, produces a well-marked reaction, while a more advanced case produces a smaller and less intense reaction.

The reaction in an early case is seen to be as follows: Around the site of injection a well defined area of induration and hyperaemia, measuring about 1 in. in diameter appears within twenty-four hours, the edges gradually fading to normal skin; it is somewhat tender to touch, and the patient complains of a feeling of tightness in the arm and a slight burning sensation. In about forty-eight hours the tightness and burning have disappeared; the hyperaemia now begins to fade, and at the end of another twenty-four hours it has practically disappeared, leaving only a brownish discoloration, which may last one or two weeks.

In an advanced case the appearance of the reaction is materially the same; the area of hyperaemia and induration, however, is very much smaller, and may only measure ¼ in. in diameter, and is less marked. All degrees of intensity of the reaction are met with, from the well-marked and tender area of the early case to the small, ill-defined, painless area of the advanced.

Another factor of importance is the time which intervenes between the application of the test and appearance of the reaction, which in an early case is developed in twelve hours, whereas in a more advanced case it is not developed until the lapse of twenty-four hours. It has been noted also that the earlier the case the longer the reaction remains visible—an early case retaining the hyperaemic area for three or four days, while in an advanced case it begins to fade on the second day.

It is possible to tell, therefore, from the appearance, onset, and disappearance of the reaction, how far advanced the disease is.

Children react well to this method of cutaneous diagnosis, but the test should be performed with a diluted tuberculin. It has been customary to use a dilution of 1 in 25 for children under 10 years and of 1 in 10 for those from 10 to 16 years.

The appearance of the reaction has been described as appearing in three types—first, second, and third—corresponding to the first, second, and third stages of the disease. It has been noted that in cases in which the disease has become arrested, the reaction tends to approximate to that of an early case. In a number of cases in whom a reaction of the second type was obtained on admission to a sanatorium, a reaction almost as well marked as that of an early case was obtained after six months' treatment. So by this method it is possible to decide whether a case under treatment is progressing favourably or otherwise.

When performing the intradermal test for the diagnosis of tuberculosis the needle should be held parallel to the skin, and the skin rendered tense by encircling the forearm with the thumb and forefinger, and drawing the skin taut. The point of the needle is then inserted obliquely between the epidermis and the deeper layers. The point should not penetrate deeper than the epidermis. A small bulla is produced by the injection, on the surface of which, a few small dimples are to be seen, with a cutaneous hair in each, if the injection has not been too deep.

Koch's original tuberculin was concentrated, by boiling, to one tenth its volume; this would seem to be unnecessary, since a tuberculin which has been heated to over 60° is less toxic than one which has not been heated, and the proteoses are more easily precipitated by alcohol when the tuberculin has not been exposed to temperature above 60° C. Judging from the analogy of other bacterial toxins, heating would seem to reduce the toxicity of tuberculin; this has been proved in a series of experiments undertaken to determine the toxicity of old tuberculin.

The treatment of tuberculosis was undertaken with proteose-free tuberculin in about 100 cases; of these, 50 completed a full course. The results indicate a more extensive trial, and compare very favourably with those obtained with other forms of tuberculin.

It is easily borne, and can be given in cases where other forms of tuberculin produce a marked general reaction, and for this reason it is very useful in the treatment of ambulant cases. A general reaction is rarely produced, and only in acute cases, or with large doses. When this does occur it is not very severe, and usually is of short duration. Headache and lassitude are the principal symptoms complained of; the temperature may be elevated one degree, but usually falls within a few hours.

It can be given with safety in febrile cases; in fact, it has a beneficial effect on the temperature. In many cases the temperature has been reduced to normal by its

administration. The initial dose is found to be 0.001 c.cm., but in acute cases, if this dose produces a general reaction, the dose should be reduced to 0.0001 c.cm., and rapidly increased. The dose is increased every other day by 0.001 c.cm. until 0.01 c.cm. is reached, when the increase may be more rapid. The maximum dose is 1.0 c.cm., and to reach this about three months is the usual time required. For children the initial dose is 0.0001 c.cm. This should be gradually increased by 0.0001 c.cm. every other day until tolerance is established, when the increase may be more rapid.

Improvement is usually manifested in about a week after the commencement of the administration, and is evidenced by a feeling of improvement expressed by the patient; at first there is a slight increase in the cough and expectoration, followed by a diminution, and soon there is a cessation of night sweats.

During the treatment of the 100 cases only one patient had haemoptysis, and that only of a slight nature. It would seem, therefore, that proteose-free tuberculin does not increase the tendency to that condition.

Of the 50 cases who had a complete course of proteose-free tuberculin, 45 were suffering from pulmonary tuberculosis, 2 from early lupus, 1 from early spinal caries, 1 from tuberculous glands of the neck, and 1 from tuberculous disease of the hip-joint.

Of the 45 cases of phthisis, 17 were in the early stage, with the disease confined to one apex; 12 were in the second stage, with the disease in both apices or in parts of two lobes; 16 were in the third stage, with cavity formation, or having some tuberculous complication, such as phthisis laryngei.

Some of these cases were treated in hospital, some in a sanatorium, and some by the ambulant method. All derived benefit from the treatment, especially the early cases of phthisis and the surgical cases.

The time which has elapsed since the cessation of the treatment is not long enough to decide whether the benefit is permanent or not, but the rapidity with which the physical signs cleared up in many of the cases, and the general improvement which was seen to follow the administration of proteose-free tuberculin, justify the continuance of the treatment on similar lines.

I am indebted to Dr. Margaret Sharp, of Bradford, for the notes of several of the cases.

It is estimated that there are 100,000 blind persons in the United States. The knowledge of this fact led some time ago to the appointment of a commission by the Medical Society of the State of Pennsylvania, and on the initiative of that commission the Pennsylvania Society for the Conservation of Vision has recently been formed. It includes laymen as well as doctors. An active campaign has been begun against ophthalmia neonatorum, avoidable eye injuries in trades, trachoma, wrong lighting of buildings, and the like causes.

The week of celebrations organized by the *Evening News* to commemorate the publication of its 10,000th number was opened on Monday, November 17th, when an interesting series of medical and scientific films was exhibited to an audience of over seven hundred doctors and nurses at the West-End Cinema, Coventry Street. The programme included films showing the movements of protoplasm, the germination of pollen grains, the process of obtaining the intestinal juices and the digestion of albuminoids, the blood circulation in the lung of a frog, trypanosomes of sleeping sickness in the blood of a rat, and numerous other items of scientific and biological interest. A demonstration of the progress of radio-cinematography was also given; and Mr. George Cunningham, the organizer of the Cambridge Dental Institute for Children, presented an interesting series of photographs illustrating the formation, growth, and decay of the teeth, and the prophylactic work carried on at the Dental Institute under the direction of Mr. W. H. Jones, the borough dentist of Cambridge. Sir James Crichton-Browne, who presided, called special attention to this section of the programme, and declared that it was high time that the nation was awakened to the ravages of dental decay and the need of taking measures to arrest it. The existing state of affairs was not inevitable, and he was not one of those who believed that dental decay was an essential feature of modern civilization, or that the superman of the future would have a swollen head and toothless gums.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

NYSTAGMUS.

As reported in the Journal of November 1st, p. 1152, Mr. Harrison Butler stated at the Brighton meeting that miners' nystagmus was not of the same type as ordinary or non-miners' nystagmus; that the movements in miners' nystagmus were often those of divergence of both eyes together, convergence of both eyes together, or one eye rose while the other fell, and that this was not the case in non-miners' nystagmus; in other words, the movements in miners' nystagmus are non-concomitant, and in non-miners' nystagmus concomitant.

This observation, if confirmed, becomes important from a medico-legal point of view; and, further, if miners' and ordinary nystagmus are distinct entities, then a difference in etiology may be expected. In order to investigate this point I have had put together two 12-degree square prisms, edge to edge—that is, bases out—held together by a band of white metal with a handle fixed to it. The observer looks at the patient's eyes from a distance of about 18 in., and then interposes the prisms at about 8 in. from the patient, and by moving them nearer or further from the patient the eyes are seen to approximate and separate, and a distance can be selected at which the corneae are seen edge to edge, when the movements of the eyeballs can be studied. It is necessary to hold the prisms vertically, or one eye will be seen at a different level from the other. It is also convenient to place on the patient's face a trial frame with a *plus* 20 D sphere over each eye to obtain magnification.

During the last three months I have seen 13 cases of nystagmus, and of these 2 were miners. In both these miners the movements were concomitant. One of the miners presented vertical movements; the eyes rose and fell together. Two of the patients were infants, and restless; but all the others, with one exception, presented concomitant movements. The exception was a girl aged 11 years, and here the movements were non-concomitant—that is, the eyes converged together and diverged together.

These observations are not in harmony with Mr. Butler's statement.

J. A. Wilson, M.D.,
Assistant Surgeon, Ophthalmic Institution (Royal Infirmary), Glasgow.

STRUMA AN IMPORTANT FACTOR IN EYE DISEASE.

I was much interested in Dr. Harrison Butler's paper on this subject in the Journal of October 18th, and in the main ophthalmic surgeons will agree with his opinions. I wish, however, to draw attention to one or two important points, not sufficiently emphasized, under the heading of phlyctenular ophthalmia.

This disease in children plays havoc with the eyesight, chiefly because of the recurrent attacks, and only by attacking the cause can the recurrences be prevented. Dr. Butler is inclined to attribute the trouble to an infected milk supply, but he cannot account for the etiology in 30 per cent. of cases. Careful examination will, I am sure, convince him that in 100 per cent. of cases adenoids, almost always in a very unhealthy condition, are present.

We know that tubercle bacilli have been, and can be, demonstrated in the adenoid tissue; but to this is usually added a septic infection. Whether the "attenuated tuberculosis" toxin is produced in the adenoid tissue or in another tuberculous focus arising from infected milk is a debatable point, but I am quite certain that complete removal of the former focus allows the child to resist the latter successfully, at any rate until puberty.

I consider that all children suffering from phlyctenulosis are strumous, and consequently agree with Professor

Straub in his contention that in 100 per cent. of these cases there is a tuberculous etiology.

During the past twelve years I have carefully examined the post-nasal space of cases of phlyctenulosis, and have always found infected adenoids present.

The treatment of all these cases, no matter how intense the local eye symptoms may be, is prompt removal of the adenoids, and, if necessary, the tonsils also. The result is magical; and, more important still, the tendency to recurrence disappears. In one or two cases only did recurrence take place, and the attack was mild and caused no defective vision.

We consequently have at hand a means of reducing the terrible ravages of this disease to a minimum. I discussed this subject at further length in your issue of May 28th, 1910.

The same remarks apply to photophobia in children without corneal lesion, which, though distressing, is not a serious trouble; the conjunctival condition is secondary to the chronic rhinitis (as in the eczema of the upper lip), which in turn is caused by infected adenoids. These cases get well and do not recur once the post-nasal space has been thoroughly treated.

London, W. A. S. Cobbledick.

IPECACUANHA SINE EMETINA.

Because emetine cures cases of amoebic dysentery, there is a tendency among enthusiasts to belittle the use of ipecacuanha without emetine in cases of chronic affection of the bowels. It would be a great pity if this tendency were not at once checked, because many sufferers from chronic colitis are cured—and quickly cured—by the use of ipecacuanha deprived of emetine.

I heard of two cases of chronic colitis that had been rapidly cured in this way and I interviewed one of the cases. As a result of the interview, I gave it in a case, diagnosed as chronic dysentery of two years' duration which had failed to be cured by the usual drugs. I gave subcutaneous injections of emetine for six days without result. Two days after taking ipecacuanha without emetine the patient was cured. There is only one scientific explanation of the action of ipecacuanha—namely, that it contains emetine which kills amoebae and other substances which kill other organisms.

Trinidad. Henry Alston.

TREATMENT OF CHRONIC ULCERS OF THE LEG.

I agree with Dr. Williams (October 18th, p. 1013) that the treatment of ulceration of the leg is difficult, but not unsatisfactory. My experience is that there is not a more grateful class of patients than those who are relieved of this chronic disability.

Recognizing that the multiplicity of local treatments recommended in these cases is a sign of weakness, I have for several years investigated the cause and adapted my treatment to the underlying condition as far as possible. The results have been satisfactory and rapid.

The chief of these causal conditions are: (1) Syphilis, acquired and congenital. I do not, however, place the percentage so high as 90. (2) Rheumatic poison. These cases, I am inclined to think, are fairly common. A large number of this class shows induration of a fibrositic nature before ulceration sets in. (3) Tuberculous diathesis. (4) Alteration in the blood condition due to kidney, pancreatic, or hepatic impairment, toxaemia of constipation, pregnancy, etc. (5) Mixed infection of any of the above.

An ulceration in a healthy subject will heal under ordinary surgical technique. In treating the cause the object is to bring all cases under this heading as far as possible.

The special local treatments I prefer are: (1) Skin grafting by means of small Thiersch grafts. By this means ulcerations can be made to heal under one dressing in a week. (2) To remove indurations I consider dry hot-air baths and ionization by far the most satisfactory. To remove induration when present I look upon as a necessary step to get a permanent result. To prevent relapse after-treatment must be attended to.

My results in several hundred cases are that I have, as a rule, obtained healing in from one to five weeks.

Burnley. S. T. Beggs, M.D., B.Ch.

SPASTIC MONOPLEGIA FOLLOWING HERPES ZOSTER.

F. E., a woman aged 40, was sent to Buxton for the relief of neuralgic pains following an attack of herpes two years earlier. A few small scars were observed in the area said to have been affected, which extended from about the fifth and sixth dorsal spines round the left side of the body, beneath the breast, towards the sternum. The attack seems to have presented nothing out of the common beyond a protracted period of scabbing. The neuralgic pains began about twelve months afterwards, and lately she noticed her left side from the painful region down was getting weak, and that her left foot had a tendency to drag.

The signs of spastic paralysis of the left leg were evident; knee-jerk was accentuated; Babinski's sign, ankle clonus, increased superficial reflexes, and characteristic gait were present. There was no sensory disturbance beyond a certain amount of "pins and needles"; there was no wasting of muscles, and the electrical reactions were normal. The patient's general health was good, and had been so for the past two years.

This case is interesting from the fact that paralysis followed the herpes. It is questionable whether it is the outcome of the herpes (its distribution suggests it) or whether the paralysis is distinct.

Buxton. J. C. Denver, M.B., B.Ch.

British Medical Association.

CLINICAL AND SCIENTIFIC PROCEEDINGS.

GLOUCESTERSHIRE BRANCH.

A general meeting of the Gloucestershire Branch was held at the General Hospital, Cheltenham, on Thursday, October 16th. Dr. R. Macartney was in the chair, and thirty-four members were present.

Dr. Pruen read a paper on A New Disease, which was followed by a paper on the same subject by Dr. Kirkland. Both papers dealt with the outbreak of septic throats which occurred in Cheltenham in the spring. The infecting organism was in most cases a streptococcus. The cervical glands were usually much enlarged. A feature of the disease was the large number of cases which suffered afterwards from endocarditis. Dr. Pruen ascertained from correspondence with medical friends that the disease was widespread over England. Dr. Kirkland read abstracts to show that a similar malady had occurred in Chicago and Baltimore, and was traced to the milk supply. No definite evidence was forthcoming that the epidemic under discussion was due to the milk supply. The paper was illustrated by numerous well-executed diagrams. The following members took part in the discussion: Drs. Fortescue Brickdale, Collins, Forster, Pike, Finlay, Beresford-Jones, Meyrick Jones, Powell, Affleck, Longridge. Drs. Pruen and Kirkland replied.

SOUTH MIDLAND BRANCH.

The autumnal meeting of the Branch was held on October 30th, at Northampton General Hospital, under the presidency of Dr. Conning Hartley, Bedford. There were twenty-one members present.

Cases and Specimens.—Dr. Milligan (Northampton) read notes of a peculiar abdominal case in a boy aged 16. The symptoms and signs were those of *Pelvic tumour*, with attacks of severe pain. At the operation the growth was found to be retroperitoneal and cystic in nature. After enucleation, it proved to be a kidney with congenital hydronephrosis. Dr. Milligan also showed a specimen of fibroid tumour of uterus, weighing 12 lb., in which hysterectomy had been performed. Mr. Percival showed a specimen of hypernephroma. There had been severe attacks of pain and haematuria, and the radiograph showed a large kidney shadow.

High Blood Pressure.—Dr. Armstrong, of Buxton, then addressed the meeting on high blood pressure and its treatment. After showing the various methods of estimating blood pressure, he said the causes of increased pressure were: (1) General autointoxication, (2) absorption of putrefactive materials from intestines.

(3) retention of gouty products, (4) imperfect metabolism, (5) excessive eating of nitrogenous foods, especially when large quantities of fluids are taken at meals; (6) want of exercise, (7) defective kidney action, (8) nerve strain, (9) excess of tobacco, alcohol, and strong tea, (10) syphilis. The important point about treatment was, he said, the recognition of two distinct stages of the disease—namely, (1) presclerotic, (2) arterio-sclerotic. Great improvement was possible in the first stage, and the lines of treatment were as follows: Stimulation of general metabolism and oxidation, attention to the action of the bowels, kidneys, skin, and lungs, relief of strain, and avoidance of excess in alcohol and tobacco. Drugs were only temporary in their action, but he recommended salines every day and blue pill twice a week. Gastric atony should be treated by 5 to 10 m of freshly prepared fuming hydrochloric acid in water during the meal. He mentioned the use of iodides and iodothyroidin, and strongly advocated courses of strong radio-active water, together with the use of oxygen baths. Exercise without fatigue was very necessary, and he obtained the best results by the use of the Bergonie electric chair, which resulted in a reduction of the body weight and steadied the action of the heart. The subject was discussed by members present, and Dr. Armstrong replied.

Reports of Societies.

MEDICAL SOCIETY OF LONDON.

At a meeting on November 10th, Sir David Ferrier, President, in the chair, Dr. J. S. Risien Russell, in opening a discussion on the *Treatment of neurasthenia*, said it was important to recognize that there were many different types of the affection, each demanding particular treatment. There were three main groups—cerebral, spinal, and cerebro-spinal—and the patients of the first group could be conveniently divided into those whose symptoms were chiefly physical and those whose symptoms were chiefly psychical. The nationality and the temperament of the individual must be given due weight—considerations as important as the question whether the symptoms indicated exhaustion or undue tension with irritability of the nervous system. The cause should be sought out and, if possible, removed, but its removal would not suffice to bring about a cure. In a few cases the outlook was hopeless, especially in that variety in which the individual was born with a tendency to the affection and in whose heritage was a neuropathic taint. One of the essentials of treatment was to inspire a hopeful outlook. The best chance of success lay in a "rest cure," provided it was conducted in a home given up to treatment of the kind. Personality played an important part in the treatment. The attitude to adopt was that of sympathetic attention to the detailed account of the patient. In certain cases "suggestion" was advisable; in others massage and electrical treatment did more harm than good. Massage should only be employed if an adequate amount of rest could be secured. The pack and warm bath were especially useful in insomnia, whilst the needle bath and spinal douches were useful, particularly in the sexual and spinal forms. Spermin was a useful adjunct, alone and combined with the various glands of internal secretion. Drugs played a secondary part. He then spoke of the uses and limitations of strychnine, bromide, arsenic, glycerophosphates, lecithin, phytin, iron, and hypnotics. The treatment which followed "rest cure" was little less important than the "cure" itself. Dr. James Taylor described the neurasthenic temperament, giving as examples the inhabitants of the Orkney and Shetland Islands. The great majority of cases of induced neurasthenia were due to hard physical strain, combined with anxiety or unsympathetic environment or uncongenial work. Medical treatment of all such cases must follow similar lines. They must be removed from their work, put under different surroundings, and kept away from anything likely to excite the old feelings of helplessness and almost despair. The ordinary rest cure was not at all suitable for the great majority. Each case must be tackled as a separate problem. Rest, massage, and electrical treatment should be combined with appropriate recreation. With regard to drugs, he favoured chiefly sedatives and stimulants, of which bromide and strychnine were the types. Dr. T. B. Hyslop remarked that imperfect venous drainage played an important part in this disease. He had found benefit to accrue from complete rest of the areas which were drained defectively. One principle of treatment was to increase the force of the arterial wave by cardiac stimulation, and to favour the venous return by aiding the respiratory venous suction by forced inspiration *plus* passive pressure or massage, extending from the occiput downwards. Abdominal massage was also of considerable value. Mr. Donald Armour dwelt on the importance of effectively treating head injuries, for in such neurasthenia would develop if they were untreated. Dr. Leonard Guthrie discussed especially the neurasthenia of early life. The term implied not only readily induced exhaustion, but also supersensitiveness to stimuli and excessive reaction thereto. Dr. Morris B. Wright spoke of the value of suggestion in the hypnotic and hypnoidal states, and Mr. A. G. Buchanan of the value of psycho-therapy. This he divided into: (1) Methods of persuasion; (2) methods of re-education; (3) suggestion in the hypnoidal state; and (4) psycho-analysis. Further discussion was adjourned till November 17th.

ROYAL SOCIETY OF MEDICINE.

Clinical Section.

At a meeting on November 14th, Mr. Charters J. Symonds, President, in the chair, the following were among the exhibits: Dr. A. M. Gossage: *Subcutaneous granulomata* in a girl aged 3½ years. The three probable causes for granulomata of this type were syphilis, tubercle, and sporotrichosis. In this case a negative Wassermann reaction showed the absence of syphilis, and the histological appearance, rapid improvement with potassium iodide, and a negative von Pirquet reaction weighed against the diagnosis of tubercle. The cause was probably sporotrichosis, but until the organism had been cultivated from the case the diagnosis was uncertain. Mr. W. J. Midelton: Two cases of *Arthritis deformans* in women, aged 60 and 54, treated by continuous counter-irritation. Both had improved very considerably. Dr. F. Parkes Weber: (1) *Rheumatic nodules associated with rheumatic torticollis* in a boy aged 11. The nodules were of specially large size over the knees. There was probably some slight myocardial affection, and possibly mitral disease. An affection of the olecranon bursae suggested that a kind of true rheumatic fibrositis, analogous to that which produces rheumatic nodules over the periosteum and fibrous structures, was the cause of the wry-neck. (2) *Angio-keratoma with bony changes* in a boy aged 16; *x* rays showed considerable rarefaction of the hand bones and those of the feet, the distal portion of the terminal phalanx of the left big toe having disappeared. There was no evidence of definite attacks of Raynaud's disease. Dr. W. Essex Wynter: *Haemophilia* in a man aged 22, who, since the age of 8, had frequently had attacks of pain and swelling in the joints, with limitation of movement, and also attacks of haematuria. Dr. J. H. Drysdale and Mr. G. E. Gask: A case of *Splenic anaemia*. Splenectomy had been performed, but had been followed eighteen months later by haematemesis. The patient still had leucopenia, and many of the red cells were abnormal. Dr. Arthur F. Hertz and Mr. D. W. Johnson: (1) A case of *Cervical rib* with marked vascular symptoms, in a woman aged 45; (2) a case of *Myatonia congenita* in a boy aged 3½ years. Mr. C. A. Ballance: A woman, aged 20, whose facial paralysis had been treated by end-to-end facio-hypoglossal anastomosis, and by end-to-end anastomosis of the descendens noni to the hypoglossal. Mr. W. H. Battle: A case of *Microglossia* in a child aged 1⅓ year. Dr. Albert Wilson read a short paper on the treatment of syphilis by arsacetin, and excision of the primary sore.

Surgical Section.

At a meeting on November 11th, Mr. Makins, President, in the chair, a paper on *Pyeloradiography*, read to a previous meeting by Mr. Frank Kidd, was discussed. Mr. Gilbert Scott said that the *x*-ray couch should be higher than usual and be provided with a fly-leaf, so that the patient could be shifted without moving the table. The surgeon should insert a catheter with opaque and transparent segments; each kidney should be done separately; the renal pelvis must be kept full. Two plates should be taken—

one in full inspiration, the other in full expiration. He did not recommend the use of the fluorescent screen. Mr. THOMSON WALKER said that pyeloradiography required careful co-operation between the surgeon and the radiographer. There was an element of danger in the procedure, as a case had been reported in which the pelvis had burst from pressure. When distended there was usually pain at the anterior ends of the ninth or tenth ribs. In hydronephrosis the kidney was usually insensitive; no anaesthetic should be given. A 10 to 20 per cent. solution of collargol must be used to give a good shadow, and he had seen no bad effect from it. It was easy to exaggerate the dangers and to minimize the usefulness. Mr. RALPH THOMPSON thought pyeloradiography was useful in the diagnosis of misplaced kidneys, and in distinguishing vague shadows and the kidney itself from surrounding structures. Mr. A. E. JOHNSON said that pyeloradiography could be performed with slight discomfort; but the amount of pressure should be as small as possible. He always first looked for the tip of the ureteral catheter with the fluorescent screen, and did not use a compressor. The operation was a necessary aid in the making of a diagnosis of unilateral pain of unknown origin, in doubtful hydronephrosis and pyonephrosis in congenital abnormalities, in the differential diagnosis of renal tumours, in interpreting *x*-ray shadows and the extent to which a kidney was damaged. It was most important in the early diagnosis of dilatation of the pelvis and in telling whether a palpable kidney was movable or simply situated at a lower level than normal. It prevented unnecessary renal operations and enabled operations to be performed early. Mr. FRANK KIDD, in reply, said that the main object of his paper was to discover the damage done by the collargol; none was done if the buret was not raised more than 10 in. above the penis, but the examination must be made quickly.

SUBSECTION OF PROCTOLOGY.

AT a meeting on November 12th, Mr. SWINFORD EDWARDS, President, in the chair, Mr. ASLETT BALDWIN described a case of *Round-celled sarcoma of the rectum* in a woman aged 42. The growth, with 6 in. of bowel, was excised, together with the posterior vaginal wall. She retained perfect control of her sphincters. The PRESIDENT mentioned a case of fibro-sarcoma of the rectum in a girl, aged 25, on whom he had successfully performed the combined abdomino-perineal operation; and Mr. GORDON WATSON instanced a case diagnosed as a gumma of the ructum but which proved to be a sarcoma, secondary deposits appearing around the umbilicus. Mr. LOCKHART MUMMERY reported (1) a case of haemorrhagic proctitis in a girl, aged 29, who had twice been operated on for piles and later received cataphoresis with zinc sulphate and 40 milliampères; the case was still under treatment; (2) a second case of *Auto-intoxication* with acute abdominal distension in a woman, aged 39, who had been treated with enemata, pituitary extract, appendicostomy and ileo-sigmoidostomy without avail; later on 3½ ft. of large intestine, which was quite devoid of muscular tissue, was removed. Mr. CHARLES RYALL thought the second case proved the futility of lateral anastomosis; bismuth was shown by the *x* rays to go to the end of the caecum in spite of the division of the ileum. Mr. GORDON WATSON instanced a case in which although ileo-sigmoidostomy relieved the obstruction, the patient died in three days with a perforation of the caecum. Mr. DREW said he had found signs of intestinal obstruction to supervene even with a patent ileo-sigmoidostomy; he proposed in future to divide the colon above and bring it to the surface as a mucous fistula. Mr. MUMMERY, in reply, advised an end-to-end anastomosis with an appendicostomy. Mr. SAMPSON HANDLEY described a *New method of administering saline solution* after abdomino-perineal excision of the rectum. These cases, he thought, were lost from shock; using his method he had had only one fatality out of 9 cases, and that from intestinal obstruction. Mr. WATSON thought such cases died, not from shock but from haemorrhage, peritonitis, or hernia. Mr. MILES said that out of 64 cases he had had 25 deaths; the mortality was greater in women than in men; he had had no successful case in a patient over 60. Most of the fatalities were due to sepsis, produced in the division of the colon. He prevented shock by using oxygen, strychnine, brandy, and saline. Mr. HANDLEY, in reply, said that his method deserved a trial; his cases died of late shock on the third or fifth day. Mr. LOCKHART MUMMERY, in a paper on haemorrhagic proctitis, said that it was a rare condition, occurring in females aged from 20 to 30. There was often a family history of bleeding; the mucous membrane was spongy, dark, and gritty, with superficial ulceration; it resembled haemorrhagic colitis, but there was no evidence of the presence of the pneumococcus. It was difficult to cure; he used applications of fuming nitric acid or injections of silver nitrate.

SECTION OF ANAESTHETICS.

AT a meeting on November 7th, Dr. J. BLUMFELD, President, in the chair, Mr. FLEMMING gave particulars of a case of *Tachycardia* in a healthy girl, aged 12, who was undergoing radical cure for hernia. The heart was normal and pulse-rate before operation 84. No alkaloids had been given previously. Anaesthesia was normally induced with open ether. Five minutes later, after operation had been commenced, but before any traction had been made on the sac, the pulse-rate was noticed to have increased to 274. The patient was apparently well, the anaesthesia moderate, and no cyanosis present. Later on the pulse-rate rose to 288. A change was made to chloroform and then back to ether without any alteration of the rate. The operation lasted about thirty minutes. Ten minutes after operation there was some retching, and a pulse-rate of 264. The patient was then turned on to the left side, when the pulse almost immediately dropped to 84. Dr. BEZLY THORNE related a case of paroxysmal tachycardia, lasting four to six seconds, intermitting with a pulse-rate of 80, in a case of strangulated hernia in a patient suffering with aortic regurgitation and aneurysm of the common carotid artery. Preliminary doses of morphine and atropine were given, and infiltration of novocain and adrenalin, followed by chloroform, was used at the operation. The tachycardia occurred the day after operation. He also mentioned a case of tachycardia in which pressure over the precordium had given relief. Mr. J. H. CHALDECOTT, in a paper read in his absence, on the *Anoci-association* method of Crile, pointed out that nitrous oxide was only used to keep the patient unconscious, and that for surgical anaesthesia one had to rely on infiltration by novocain, urea, and quinine. Any insufficiency in the latter would not be masked by the nitrous oxide. The chief difficulties of administration were in the early stages, especially if the patient had to be moved or lifted, and also during rough manipulations, and from the presence of gauze packings, etc., of the abdomen. Hewitt's apparatus was used, and no rebreathing permitted. The author had an experience of 60 cases, and his results had been very encouraging, unpleasant after-effects being insignificant, except in a few cases. He thought that a good trial of the method would prove it of great value, especially in bad cases. Mr. C. W. G. BRYAN, in a communication on the same subject, agreed with Crile that success largely depended upon the local injections and not upon increasing the depth of anaesthesia. Deep general anaesthesia merely masked the trauma inflicted on the patient's nervous system, and with this method painful manipulations were at once made manifest by cyanosis and rigidity. The injection should be made rapidly, with pressure into the various layers, before incision. Abdominal wall infiltration was sufficient where there was not much dragging on viscera. For complicated and deeper manipulations, retroperitoneal and mesenteric infiltrations would be necessary. Difficulty from cyanosis and rigidity was experienced in gastro-enterostomies, and in operations in the left upper part of the abdomen. Probably injections in the region of the coeliac axis would block sensations from most of the abdominal viscerae.

SECTION OF LARYNGOLOGY.

AT a meeting on November 7th, Dr. D. R. PATERSON, President, in the chair, the following were among the exhibits:—The PRESIDENT: Three foreign bodies removed from the bronchi of different patients—namely, a piece of button, a piece of mutton bone, and a feather 6 in. long. Sir STCLAIR THOMSON remarked that the mortality from foreign bodies in the air passages, which was formerly as high as 60 per cent., had dropped to about 1 to 3 per cent.

since the introduction of the improved methods of treatment; and Mr. Herbert Tilley described the removal of a green pea from the right bronchus by an improvised method. Dr. P. Watson-Williams: Notes of a case of *Cerebro-spinal rhinorrhœa*, with subsequent sinusitis. Dr. Dan McKenzie: A case of *Endothelioma of the ethmoid*, which showed no sign of recurrence six months after removal by operation. Mr. W. Mollison: A case of *Epithelioma of floor of mouth* and tongue, and ulceration of soft palate. Mr. Herbert Tilley drew attention to the tendency of chronic ulceration of the mouth to become malignant. Mr. Philip Turner and Mr. W. M. Mollison: A case of *Pneumococcal infection of the mouth and pharynx*, in which great improvement had occurred without the aid of vaccine treatment. Dr. Donelan: A case of *Double paralysis of the superior laryngeal nerves* in a patient suffering from disseminated sclerosis due to lead poisoning. Mr. H. A. Kischi: The *Rhinomanometer*. The President remarked on the difficulty of maintaining the nasal cavities undisturbed during the use of this kind of instrument. Mr. H. J. Davis: (1) Skiagram of a farthing in the œsophagus of a child aged 2 years; (2) a case of *Fixation of the right vocal cord* in a man aged 61; it produced no symptoms. Mr. Douglas Halmer: A case of *Perforation of the septum nasi*, which caused inspiratory whistle. Mr. J. H. Connolly: A boy, aged 5 years, with a large pulsating vessel in the right portion of the posterior pharyngeal wall.

EDINBURGH OBSTETRICAL SOCIETY.

At a meeting on November 12th, Sir Halliday Croom, President, in the chair, Dr. Haig Ferguson, the retiring President, in a valedictory address, mentioned a decrease in the cases in the maternity hospitals of Scotland since the Insurance Act came into operation. In Glasgow, from January 1st to August 31st of this year, the decrease in indoor and outdoor cases was 717, in Aberdeen 145, in Edinburgh 381, in Dundee 121. The teaching of students was correspondingly restricted, and the output of nurses was correspondingly less. Emphasis was laid on the necessity of a Scottish Midwives Bill. It was a necessary antidote, so far as the welfare of the women and infants was concerned, to the maternity provisions of the Insurance Act. The deaths of the following Honorary Fellows of the Society were referred to: George Granville Bantock, Professor Henry J. Garrigues, Professor Paul Segond, and Professor Sir W. Japp Sinclair. Dr. A. A. Morrison, in a paper on *Cloacal vesical extrophy in the female*, recorded a case—a ninth child—which died three days after birth. The extroverted area was triangular in shape, the apex of the triangle being below the attachment of the cord. The centre of the area projected and terminated in a proboscis-like structure, at the end of which was an opening through which meconium passed. On the lower part of the area there was an evagination surface depression near a slit-like orifice, which was found later to communicate with the large intestine. The opening through which urine escaped was to the right of and behind this eminence. On opening the abdomen the intestine was found attached by a thin mesentery to the posterior abdominal wall, and to pass mesially into the true pelvis. It opened at the elevation in the centre of the extroverted area. The large intestine was represented by a small oval body lying in the pelvic cavity, and was attached to the evagination surface referred to. The vagina was double, the two canals being united in their lower half. The right vagina was the larger, and was connected with a partially developed uterus with normal broad ligament, Fallopian tube and ovary. The left vagina had a very rudimentary uterus, but the broad ligament, tube, and ovary were normal. The right vagina opened on the extroverted area by a small opening. The right kidney lay in the pelvic brim, and the ureter opened on the extroverted surface. The left kidney was in its normal position; this ureter was greatly dilated, and stopped at the level of the left vagina. The pubic symphysis was absent, and the iliac and pubic bones were widely separated anteriorally.

GLASGOW MEDICO-CHIRURGICAL SOCIETY.

At a meeting on November 7th, Mr. A. Ernest Maylard, President, in the chair, Dr. Malcolm Watson, in an address on *Prevention of malaria*, mentioned a drainage scheme which was devised and put into operation in the Kapar district of the Federated Malay States in 1903. By felling the jungle, draining by ordinary open drains the pools in which the *Anopheles umbrosus* bred, and by cultivation, complete control was obtained over malaria on the low coastal land, which, on account of its stiff clay soil and high ground water, was supposed to be the stronghold of the disease. Among the hills, however, in spite of good houses on dry elevated sites, with pure water supply and excellent sanitation, malaria of the most malignant kind persisted. Having found that this was due to the presence of the *Anopheles maculatus*, which bred only in hill streams, the lecturer adopted the measure of carrying the streams underground in pipes for a certain distance, about half a mile, round dwelling places in hill land. This was done with complete success where the full distance was piped, and marked improvement where a more restricted area only was drained. It was to the presence of this hill-stream-breeding mosquito that malaria was due in the hilly parts of Hong Kong and of India. In Japan, the only *Anopheles* mosquito which was found bred in rice swamps and carried only the two benign forms of malaria. In Panama engineering works constantly interfered with drainage, and quinine prophylaxis was practically not used, but the system of oiling was perfect—the whole area for about half a mile round all dwellings was oiled once a week so thoroughly that every mosquito was killed. On a total area of 53 square miles thus treated, in jungle, under the worst possible conditions, the Americans had built up and maintained a labour force of over 50,000 men, whose death-rate compared favourably with that of any corresponding population even in temperate zones. In the inhabited portion of British Guiana drainage and agriculture had brought about the disappearance of both *A. albimanus* and *A. argyrotarsis*, and produced a fall in the incidence of malaria equal to that in Panama. Populations even lived in health on the edge of rice swamps, the mosquitos being eliminated by a proper control of the irrigation. The freedom from malaria which distinguished Barbados among the West Indian Islands had been attributed to the presence of the small minnows called "millions," which were supposed to eat the mosquito larvae, but was really due to the circumstance that the island was composed of a coral chalk so pervious to water that there were no surface pools, and consequently no mosquitos could exist.

LIVERPOOL MEDICAL INSTITUTION.

At a meeting on November 6th, Mr. Robert Jones President, in the chair, Dr. C. J. Macalister, in a note on the *Treatment of emphysema*, said that he had noticed that in these patients the main difficulty was in expiration. He had successfully aided the expiratory forces by a band of strong elastic webbing round the chest. He showed two patients—one a child, the other an adult male—in whom the condition had been greatly relieved. He did not employ the method in cases in which much bronchitis was present. Sir Dyce Duckworth, in a paper on the requirements of *Modern clinical teaching*, suggested that the want of the present day was training in accurate observation. The old teaching in botany and the allied sciences gave a certain preparatory training in observation that had its value. Scientific training to-day was pushing into too small a space the necessary clinical training and experience. Training in the lost art of physiognomical diagnosis was also needed; the humoral personality of Charles Richet was clearly allied to the old diathesis, and could give a clue to many problems in clinical medicine. In treatment clinical observation must be the final court of appeal. If the inherent vitality of some individuals, and even of some races, such as the Hebrew, were forgotten, a physician might be led to give a gloomy prognosis, and so provide triumphs for the faith and spiritual healers. The proposed adoption of the German ideal—namely, of teachers of clinical medicine debarred all private practice—would lead to a limited outlook. Such a scheme was not likely to produce such good practitioners as the present British plan. The object of medical education was not to pass students through examinations, but to prepare them to be useful practitioners. The teacher must be human and sympathetic, not looking upon patients as mere cases. Dr. T. R. Bradshaw spoke of the practical difficulties of

putting all a student's clinical training into two years; it was far too short a time in which to cram all that had to be acquired. Sydenham's idea of the constitution of fevers was an example of empirical ideas which had not proved to be of value.

MANCHESTER MEDICAL SOCIETY.

AT a meeting on November 5th, Dr. HEYWOOD in the chair, Dr. DONALD CORE, in a paper on *Clinical types of early mitral stenosis*, pointed out the possibility of auricular fibrillation and pulmonary infarction making their appearance without any subjective symptoms of hyposystole having attracted attention. In one group of cases of mitral stenosis the dominant symptom was wasting, and in another functional nervous manifestation. A double second sound was an important factor in the diagnosis and prognosis of mitral stenosis. Mr. J. MORLEY, in a paper on *Spinal anaesthesia*, expressed the belief that it should receive renewed attention in the light of Crile's views on shockless operations. It afforded the only sure means of cutting off all the afferent traumatic stimuli from the lower half of the body under operation, and of avoiding all tendency to nerve shock. In an experience of 66 cases operated upon under stovaine and glucose at the Ancoats Hospital during the past year it was found that a preliminary injection of morphine and scopolamine largely overcame the disadvantage that the patient retained consciousness, and might be nervous. Spinal anasthesia was suitable for routine use in all operations on the lower limbs, for haemorrhoids and other perineal conditions, for operations on the bladder and urethra, and for inguinal and femoral hernia. For operations in the pelvis there was the drawback that the Trendelenburg position could not be used. It was also excellent for appendicectomy and exploration of the lower abdomen, but was not advised for gastric operations necessitating the use of clamps. In acute peritonitis and acute intestinal obstruction it had the advantage over general anaesthesia in that there was less tendency to post-operative intestinal paralysis. In 19 operations on children the method was found satisfactory. Patients who had experienced operations under both general and spinal anaesthesia usually preferred the latter.

MANCHESTER PATHOLOGICAL SOCIETY.

AT a meeting on November 12th Dr. BROWN reported a case of *Thrombosis of the inferior mesenteric artery* in a middle-aged man. The clinical picture was one of severe colitis; *post mortem* marked atheromatous changes were found in the abdominal aorta, and a clot spread from the renal arteries to its bifurcation. The mucous membrane of the colon descendens was black and gangrenous. Dr. E. M. BROCKBANK demonstrated some slides of red blood cells in support of his belief that the erythrocyte is a bladder with an enclosing membrane of double layer, inside which lie platelets, and an unknown body which holds haemoglobin in solution. Professor A. E. BOYCOTT, in an address on *Hypertrophy and reserve force*, put forward in explanation of the latter the theory of fractional activity—for instance, nerve and muscle fibres.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.

AT a meeting on November 7th, Dr. T. WARDROP GRIFFITH presiding, Dr. J. GORDON SHARP, in a paper on the *Vital principles of foodstuffs*, said he thought there might be something in Funk's statement that he had discovered a pyramidine-like body which was related to thymine. This body was named "vitamine." He was opposed to feeding children on dried or otherwise preserved milks, and thought it was necessary also to guard against the use of foods which had been chilled or frozen for long periods. As remedies in the treatment of malnutrition, lecithins, glycerophosphates, and the nucleins were of little avail, but the crude foodstuffs (such as a mixture of eggs, fat bone-marrow, and malt extract) did good. Fats had an important action in preventing and curing scurvy, rickets, and marasmus. Dr. A. E. LITTLE read notes on a case of *Paratyphoid fever* in a man aged 38, in which a short relapse occurred after the temperature had come down to normal at the end of about four weeks. The case was notified as continued fever on account of the character of the temperature, which came down gradually for four weeks before reaching normal, when there was a relapse, with a rise of temperature for a few days. In the early stage of the illness there was nausea and vomiting occasionally, but no diarrhoea, and the duration of the rose-coloured spots was shorter than in typhoid. The diagnosis of paratyphoid fever must be made by the agglutination reaction. The following were among the exhibits:—Mr. R. LAWFORD KNAGGS: A case of intractable *Vesico-vaginal fistula* following parturition, in which the left ureter was implanted into the rectum by a sacral operation, the right kidney being subsequently removed. The patient had remained well for some four years and a half, but eventually returned to hospital suffering from prolapse of the upper and anterior walls of the bladder through the vesico-vaginal opening. Mr. J. A. COUPLAND: (1) A specimen of tuberculous stricture of the ileo-caecal valve, which had produced acute intestinal obstruction. It was treated by excision of the caecum, ascending colon, and a portion of the ileum, and end-to-end anastomosis, with a satisfactory result. (2) A *Cystic appendix* which had become adherent to the sigmoid flexure, and had given rise to strangulation of a loop of small intestine. Mr. J. F. DOBSON showed a case of *Ankylosis of both hip-joints* in the flexed position, following acute suppurative arthritis. A subtrochanteric osteotomy was performed on the left side; on the right side arthroplasty was performed on the lines laid down by Dr. Murphy, with an extremely satisfactory result. Mr. ALEXANDER D. SHARP showed a case of pharyngeal tuberculosis in a woman, aged 34, confined chiefly to the right half of the pharynx. Agonizing pain on swallowing was relieved by local application of pure lactic acid every third day.

ULSTER MEDICAL SOCIETY.

AT a meeting on October 30th, Mr. A. B. MITCHELL, in a presidential address, dealt with *Incapacity following injury*. All would agree, he thought, that since the passing of the Workmen's Compensation Act, convalescence after injury had been longer than formerly. Medical men must hold themselves responsible not only for the employment of the best and most advanced treatment, but also for the prevention of abuse and of the exploitation of the profession. In regard to abuse, he related some cases in which the patients had expressed surprise that they had been allowed to go on as far as they had. He also showed lantern pictures of maimed hands, whose owners nevertheless retained full wage-earning capacity—sometimes in highly skilled work—and drew a contrast between such cases and those in which the loss of part of a finger was pleaded a cause of permanent inability for work. Such cases showed how much care a medical man should take before deciding to certify that a patient was hopelessly deprived of all wage-earning capacity. The use of the Roentgen rays possessed by philanthropic institutions should not be exploited by rich companies in gaining evidence, and cases of supposed fractures should be *x* rayed from several different positions. The importance of the latter precaution was illustrated on the screen.

BRITISH OTO-LARYNGOLOGICAL SOCIETY.

AT a meeting on October 29th, Dr. WALTON BROWNE (Belfast) in the chair, Dr. H. D. MCCULLOCH, in a paper on the therapeutics of *Radio-active agencies in disease*, with special reference to the cure of chronic nerve deafness and deaf-mutism, stated that since the date of his original statements on this subject a good deal of corroborative evidence had accumulated abroad. He also mentioned his gratifying experience in a typical case of Monière's vertigo, and he drew special attention to the promise of success held out by the application of radio-active agents in preventing deaf-mutism, the notes of one case being given. The paper was concluded by a tabulated list of 64 cases of deafness which had been treated by him. Dr. WALTON BROWNE mentioned a case of *Otosclerosis*, reported at the recent International Otological Congress, as having markedly benefited by radium. In

that case the improvement had been maintained. Dr. Coubro Potter pointed out the desirability of further clinical evidence being supplied to support the claims of improvement by this treatment. Mr. Adair Dighton said he could not understand how any one method could be expected to cure such diverse conditions as had been described by Dr. McCulloch, and strongly objected to the statement that this treatment "promised to be a boon in the prevention of deaf-mutism," as this was not only misleading, but on the fact of things impossible. He objected also to the loose way in which the terms "acquired deaf-mute," "chronic deaf-mute," etc., had been used, both being unknown conditions. Dr. Walker Wood stated that he had seen four cases of Dr. McCulloch's and tested them before and after three months' treatment, and, though the hearing had not much improved, still there was an improvement. Mr. Charles Heath gave a demonstration of methods of draining suppurating ears. In its course he pointed out (and illustrated his statement by moist specimens, diagrams, and patients) that when discharge escaped through a perforation in Shrapnell's membrane, the change of route was due to the fact that the channel leading down to the tympanum inside the incus was obstructed by swelling of the mucosa of the inner attic wall, and that if the parts outside the incus (including Prussac's space and Shrapnell's membrane) were not unduly weak and capable of being perforated by the pressure of the pus, complete obstruction and acute mastoiditis would result. One of the patients he exhibited had three weeks previously undergone a conservative mastoid operation for so-called attic suppuration. The disease had existed for two years; there was a perforation in Shrapnell's membrane with a polypus projecting through it; there were deafness to air conduction (a 50-in. watch being inaudible close to the ear), severe pain, and vertigo. Since the operation the pain and vertigo had ceased, and the patient could already hear the watch at 4 in. It was only when discharge from the antrum descended inside the incus that it was able to reach the tympanic cavity and escape thence in the usual way through a perforation in the membrana tensa. If the case he had exhibited had been one of epitympanic or attic disease, as the books erroneously state, his operation upon the mastoid antrum alone would not have given such complete relief as has been afforded. The result proved that the disease was in the antrum, and, further, it was observed to be there during the operation. Other cases of this kind had been recorded by the speaker in the *Lancet* of April, 1907.

ASSOCIATION OF REGISTERED MEDICAL WOMEN.

At a meeting held on November 4th, Dr. Jane Walker President, in the chair, a discussion on the work of *Medical women in the public health service* was introduced by Dr. Elizabeth Moffatt, who gave her impressions of five years' medical inspection in a country area (Staffordshire). She found that only 20 per cent. of the children suffered from ailments requiring notification; that the mothers as a whole were careful and devoted; that the teachers were interested in their charges; and that as a rule mothers in urban districts showed more intelligent interest than those in rural districts. There was urgent need, she thought, for the establishment of school clinics, and the school medical officer should be an educationalist and psychologist as well as a doctor. The position of medical inspectors was unsatisfactory in many ways, and a union of school medical inspectors should be formed. Dr. Muriel Bywaters gave an account of public health, school medical, and tuberculosis work in Eastbourne, where she had been an assistant to the medical officer of health for the past eighteen months. The town possessed an efficient school treatment centre, at which dental work, ophthalmic work, and minor operative work were carried out, and there was a school for sixty mentally deficient children; in addition, a "ringworm school" had recently been established. Since the speaker's appointment as tuberculosis officer in November, 1912, 177 patients had been dealt with, and a hospital containing twenty beds was about to be erected. The tuberculosis scheme had at first met with much opposition on the part of local practitioners, but the latter were now acting in harmony with the public health department. Dr. Sophia Seekings, in speaking of the duties of a medical officer of health with which a woman can particularly deal, said that while occupying the position of acting medical officer of health for Tottenham she had met with no insuperable difficulties. Women were specially suited for the investigation of infantile mortality, the supervision of women sanitary inspectors, and the inspection of school children. The President reported that she had been credibly informed that dental treatment was to be made ancillary under the Insurance Act. Dr. Zillah Scruby said that Buckinghamshire was the only county area in which dental clinics had been established over the entire county, every school being contributory. School treatment should be largely preventive in nature and should begin in the infant schools. Dr. Sophia Jevons pointed out that special difficulties attached to school treatment centres in London. Dr. Hilda Clark, in an account of work done by her as tuberculosis medical officer for Portsmouth, advocated centralization of health visiting in order to prevent troublesome overlapping. Dr. Letitia Fairfield considered that the feeding of school children should be more under the control of the school medical officer. Persuasion should be used with parents, and compulsion never used.

Reviews.

MEDICINE IN THE SCHOOL.

In *School Clinics at Home and Abroad*[1] Dr. Lewis Cruickshank has written a thoroughly good book, and one that should be read and studied by every one interested in the child-life of the country, whether he be a doctor in private practice, a member of a hospital staff, or of a public service; and also by the whole army of social and educational workers who are active in the interests of the younger generation. The book begins by a statement of the case for the medical treatment of school children. This is put in a commendably brief but sufficient fashion, for at this date there can be few who are not fully alive to the necessity and importance of the care of the child. Next there follows a chapter on the legal aspects of the treatment problem. Therein will be found references to and brief summaries of the various Acts of Parliament that give authority and direction for the care of the children, and also of such circulars issued by the Education Department as have a governing effect on the administration of those enactments. The Acts and circulars should be known to all those who take a share in this work. The third chapter is devoted to a well balanced argument of the advantages and disadvantages found in arranging for the necessary treatment through the variety of agencies at our disposal — treatment by private practitioners; through charitable hospitals and dispensaries; by means of "children's clubs"; the effects of the National Insurance Act upon the treatment of the child; and lastly, the work and development of the school clinic as a separate institution developed for the special use of the children by the local education authorities. The question dealt with in this chapter is one that is a matter of current medical politics, and views as to the best means of effectively carrying out the work are apt to be coloured by the positions held by the members of our medical community. The private doctor holds that he is in touch with the home life of the child, and is therefore the better able to cope with its necessities. The public service man looks to a well-ordered scheme of municipal service, so that the care of the health of the child may be effectively co-ordinated with the whole scheme of education. Dr. Cruickshank deals very justly with the situation. He points out that many of the children's complaints are of a chronic sort, requiring daily treatment, while others are of a special sort not usually dealt with by the home doctor, whilst the dental requirements are of such a sort that no scheme of private treatment could cope with it. The position of the hospitals in the treatment scheme is equally well considered; it is shown that the mass of necessary treatment required on

[1] *School Clinics at Home and Abroad.* By Lewis D. Cruickshank, M.D., D.P.H., Medical Officer and Inspector of Physical Education, Scotch Education Department; with an Introduction by W. Leslie Mackenzie, Medical Member of the Local Government Board for Scotland. London: The National League for Physical Education and Improvement. 1913. (Med. 8vo, pp. 171; 21 illustrations. 2s. 6d. net.)

medical inspection is such that no voluntary hospital can hope to cope with it, and this fact has been demonstrated by the growing tendency of hospital authorities to refuse facilities for the routine treatment of school children, as such, as part of the ordinary work of their institutions. The advantages and disadvantages of the school clinic—that is, of a dispensary worked by the educational authority—are set out in a series of propositions which may well be quoted: (*a*) The clinic provides appropriate methods of treatment not otherwise normally adequate to the demands; (*b*) it provides treatment for cases that would otherwise never be treated; (*c*) it provides more continuous treatment, and gives greater individual attention; (*d*) it may provide for the dental treatment of all children; (*e*) it provides the best means for reinspection of treated cases. Under "administrative advantages" are: (*a*) The clinic facilitates treatment without delay, without long journeys, and without long waiting; (*b*) it ensures a minimum of leakage between inspection and treatment; (*c*) it facilitates control and regularity of attendance; (*d*) medical inspection without adequate treatment diminishes school attendance, with treatment it actually increases attendance; (*e*) the clinic secures public control of treatment, and the assistance of voluntary workers with full local knowledge. Under the heading of "Social Advantages" are given: (*a*) The clinic establishes a more vital connexion on the part of the local authority with the whole movement of education; (*b*) it serves to build up intimate relations and personal knowledge amongst parents, teachers, doctors, and children; (*c*) it makes possible the scientific study of the life-history of the children, and ultimately of the community; (*d*) it gives less trouble to the parent, while it presents the physical well-being of the child as of interest not only to the child and the parent, but also the State; (*e*) when fully organized, and in effective operation, parents will be encouraged to refrain from the indiscriminate use of charity and from the abuse of hospitals; (*f*) the school clinic as part of the machinery of an educational authority may be made to serve an excellent purpose as an educational institution on matters of hygienic living. These advantages are briefly discussed, and there can be little doubt that they "make good." Against this array the disadvantages are few, and speculative. In the words of Dr. Rennet, of Chester, "it is argued that school clinics tend to lessen the sense of parental responsibility, but in actual practice it has not turned out to be so. On the contrary, by drawing attention to unsuspected, but significant, slight defects, the parental responsibility has been increased rather than diminished." The bulk of the book deals with concrete instances of the working of school clinics. Much is said of the district in which the author has worked, and there are excellent photographs of the work in progress. Methods employed elsewhere are noticed, and the splendid work of the Strassburg Municipal Dental Clinic receives fitting illustration. The book is no mere summary of educational reports: it is eminently readable.

The first edition of the *Manual of School Hygiene*[2] appeared in 1901. Since that date much water has run under the educational bridge, and many things pertaining to schools and scholars that were but dimly realized then have now become established fact. The new and revised edition does not quite satisfactorily sum up the improved condition of affairs; indeed, in some matters it is an unsatisfactory guide to the would-be student of school hygiene. In particular the inquirer on any special point of difficulty is likely to find that, whilst there is a good general statement of affairs, details are wanting. This is in part due to the large amount of space devoted to general physiology. Six new chapters thereon have been added by Professor SHERRINGTON, and, whilst the manner of its treatment is all that could be desired, it does not advance the book in regard to its special object—"school hygiene." It is excellent general physiology, but the reader might well ask for it in a separate handbook on elementary physiology, and this would have rendered it possible to meet his more immediate wants as a searcher on school matters in a more detailed manner. The book opens with a chapter on "the site and the soil" of the school, but the site so far as the aspect of the building is concerned is not treated of. The chapter on buildings is spoiled by its illustrations. The lavatory plans are not satisfactory for school purposes, or indeed any public building for the use of all and sundry. The fittings would be a constant source of worry to the school managers, and of joy to the plumber, for all the waste-pipes seem to lead directly into the traps, so that any foreign matter inserted by mischievous youngsters would effectively stop them until relieved by the plumber. It would be hard to find a modern city school where waste-pipes do not fall into an open gully set in the floor concrete; the interception is not only clean and protective against mischief, but it is cheaper to provide. There follow several sheet plans of a "large board school"; the term "board school" and the character of the plans would suggest that they dated from 1870, for the plans seem to reproduce features fashionable when these schools were first set up. The provision of a plunge-bath in the basement, and science rooms above, belies that supposition. The authors in the text suggest that the maximum number of pupils a teacher can satisfactorily deal with is 30. Well and good. But these plans provide several rooms for 90 children each, with divisible rooms for 100, and even 152 children. Again, the plans of these 90-place rooms are such that at least half the children would be seated with their backs to the only effective window light. Many such schools have been built in the past, and the authorities responsible for them have been at enormous cost to remedy their defects Again, the authors indicate the necessity for sufficient provision of halls in the schools, but in these plans there is only one hall, and the second floor rooms open on to a gallery running round its walls. Such a manner of building is costly and wasteful of space. Much work has been done of recent years on the effective artificial lighting of schools, and definite data have been provided for the guidance of school authorities; similarly the British Association has elaborated a standard for the printing of school books, but on both these points there has been a failure to use valuable information available. The general plan of the work is good, the descriptions of the common disorders of children well and clearly written, and the guidance proffered concerning clothing, games, and cleanliness thoroughly satisfactory. But even in these parts there is lacking a definiteness that will leave the reader, or much more one who turns to the book for specific guidance, unsatisfied. For example, under the "Care of the Teeth," the short paragraph tells of the dangers of decay, the indifference of parents, the value of the school dentist, and ends: "It is important that children should be taught the proper use of the tooth-brush and the importance of cleansing the teeth." But we search in vain for details that would guide the teacher in instructing his flock; yet good schemes have been worked out, and are in actual practice. The work might be so good that we hope the authors will soon be able to remedy these matters.

The Psychology of Educational Administration[3] is a most portentous education squib. It is so long that it almost fails to go off. Perhaps it would be better likened to a prodigious cracker the which, by its everlasting fizzing and banging, effectually deafens the ear to more serious sounds; or maybe the powder of the thing is damped by a relative antiquity, for the "Holmes Circular," which is the ostensible cause of the production, and is not omitted even when the author turns to other things, has long gone to the dustbin of forgotten indiscretions. The author is a veritable Don Quixote out to tilt against every one and every office. There is none good, no, not one; they are all filled with the lust of their own egoism—that is the perpetual cry of the writer. In small doses it would be funny, and, taken between the ingestion of serious matter, it is capable of raising broadsides of inextinguishable laughter. There is no class that is not pilloried, and the medical profession does not escape; only we think that with his freedom of pen and biting sarcasm the author could have gone one better than to quote at length from a play by Bernard Shaw; he has not done himself justice. Yet there are occasional gleams of

[2] *A Manual of School Hygiene.* By Edward W. Hope, M.D., Professor of Hygiene; Edgar A. Browne, F.R.C.S.E., Lecturer in Ophthalmology; and Professor C. S. Sherrington, M.D., Professor of Physiology, all of the University of Liverpool. New and revised edition. Cambridge: University Press. 1913. (Cr. 8vo, pp. 324; 22 figures, 4 plans. 4s. 6d.)

[3] *The Psychology of Educational Administration and Criticism: a Sequel to the "Holmes Circular."* By F. H. Hayward, D.Litt., M.A., B.Sc., with a preface by John Adams, LL.D., Professor of Education in the University of London. London: R. Holland and Co. 1912. (Cr. 8vo, pp. 608. 7s. 6d. net.)

surprising good sense in his writing, for at the end of the indictment of our profession there is written, "The doctor has invaded the school. Teachers should beware. Unless they have something better to oppose to the invader than tradition, experience, and the like, they will rapidly find him usurping scholastic functions. School hours, school methods, even the personal efficiency of this teacher or that, will come, directly or indirectly, under his survey. Already medical men—to their credit be it said—take a deeper interest in the child study than the majority of teachers." The author has a fluent pen, and must have thoroughly enjoyed his work, so there is good to some one.

There can be little doubt that the systematic physical training of school children has reached a higher stage of development in America than in this country, where for the most part school drill is often carried out in a perfunctory and apologetic fashion, suggesting that it is done as part of the day's routine, as a concession to a passing craze, rather than something more vital to the child's welfare than all the subjects of the elementary school curriculum put together. For this reason Miss Bancroft's book on *The Posture of School Children*[4] ought to be in the hands of every elementary school teacher. It is not only a useful collation of the opinions of the best authorities on this important subject, but contains much founded on the practical experience of the author. It is obvious that a knowledge not only of physiology but of psychology is essential to the teacher if the methods of postural correction are to be of service; the possession of infinite patience, coupled with enthusiasm for the work, is no less important. The standard which the author has set to be aimed at is reached by what she terms "efficiency methods," and the standardization of posture is obtained by what is known as "the triple test," comprising the standing or vertical line test, the marching test, and the exercise test. This is followed by individual and class "rating," and finally by class records which, posted up in a monthly bulletin, give the results of individual progress. The importance of the method lies in the fact that it substitutes motive in the pupil for nagging on the part of the teacher. In this way the child's pride and ambition are stimulated. One of the author's methods of posture drill may be strongly commended. The child having been brought to assume the correct position and to appreciate what it is, is told to relax and, after a brief period, to resume the correct attitude, at the word of command. This little drill is repeated several times in rapid succession. In this way the child's muscular sense becomes educated as to what is correct and incorrect posture. But the results of this method of training children in postural efficiency are not confined to an improvement in their physical wellbeing, for the reflex effect of attitude upon character is well known. The book is copiously illustrated, and if the methods the author advocates so enthusiastically were adopted in every elementary school in the country we should in time see fewer of those poor little stunted creatures who are such a travesty of all that a child was meant to be.

TREATMENT OF GASTRIC DISEASE.

While in pathology and diagnosis medicine is very cosmopolitan, in treatment there are distinct differences in method which do not readily pass the national frontiers. This rule is illustrated by such a book as Dr. Pron's *Thérapeutique clinique des maladies de l'estomac*,[5] wherein, though we may agree with the general principles upon which it is based, we find differences in detail from the practice followed in this country. Each nation has its own notions about diet and drugs, and in the one case as in the other it is not free from risk to make use of foreign methods. With this qualification we have no hesitation in stating that Dr. Pron's book is a sensible, sound, and useful account of the treatment of diseases of the stomach, and we heartily agree with him when he says that treatment should not be restricted to supplementing the defective digestive ferments and juices. The derangements of the chemistry of digestion occupy only a subordinate position in gastric pathology, for stomach diseases are dependent much more upon unfavourable general surroundings than on primary defects of the gastric and intestinal secretions. Moreover, while digestive troubles arising from disorders originating in the digestive organs are not the most common or the hardest to cure, the majority of cases of dyspepsia are due to general conditions and mode of life which are less amenable to treatment and beyond the control of the physician. Dr. Pron lays proper stress on the evidence that fatigue and mental or bodily shock and pain diminish the secretion of gastric juice, and that spasm of the pylorus may be determined by a variety of nervous accidents. The vast majority of women seen in the out-patient departments of hospitals who complain of digestive troubles are of this type, and to make treatment successful it is necessary to modify the general conditions of their lives; we cannot hope to obtain good results by merely dosing them with stomachics. It is interesting to note that, like most modern writers on diet and digestion, the author is a convert to the principle of a relatively low protein regimen. He fixes this at about 1 gram per kilogram of body weight, and points out that experience has sufficiently proved there is no reason for fearing, in thus dieting our patients, that they will get too small a proportion of protein food. Another point in which the author shows his common sense is in warning against the abuse of exercise in a class of whom many stand more in need of rest than of additional bodily exertion.

In his book on *Diseases of the Stomach*[6] Dr. G. R. Lockwood claims to give the results of his personal observations and careful study of his private and hospital records of cases collected in the course of many years of practice in this special field. He has certainly succeeded in giving a full account of his subject, especially from the standpoint of pathology and diagnosis; he has carefully compiled the statistics from various sources on most subjects, and has usefully reprinted these tables. In these days illustration is so cheap that it is apt to be overdone, and it can hardly be said to be necessary for the elucidation of this text to give so many reproductions of photographs of jars and beakers containing gastric contents, or the numerous neat little diagrams or "pain charts" to show the time of day at which the attacks of pain occur. Unlike most modern authors, he dispenses with any account of the anatomy and physiology of the organs under consideration, for which we thank him, but he has also omitted all description of modern methods of clinical examination of the stomach and its functions, which is perhaps hardly convenient in a book where reference to their results must constantly be made. To make an end of our grumbles, the book, although possessing an English publisher, was printed in America, and contains a good many misspellings or misprints. In a work which claims to be based upon personal observation it is inevitable to meet with many points of detail in which the author's views are not in harmony with those generally received, but these are of minor importance, and on the whole Dr. Lockwood has given a very full and careful account of diseases of the stomach. He is obviously one of the newer school, accepting the teaching of the operating surgeon as conclusive on many points where their opinions are hard to reconcile with the clinical experience of physicians. Thus he states that "recurring epigastralgia of a purely functional nature does not occur," and this dictum he prints in italics, although it is inconsistent with the experience not only of most physicians in their practice, but of at least some physicians in their own persons, who are able to state positively that there was neither organic disease of the stomach, gall bladder, nor appendix. He accepts the view that hunger pain is always significant of ulcer, but he does not agree with Moynihan that it is possible by this to differentiate duodenal from gastric ulcer. In speaking of the results of the medical treatment of cases of ulcer he complains that the patients stay in hospital only just as long as they suffer pain. This is at variance with our experience; these patients do not suffer pain for more than a day or

[4] *The Posture of School Children.* By Jessie H. Bancroft, Assistant Director of Physical Training, Public Schools, New York City. New York: The Macmillan Company. 1913. (Demy 8vo, pp. 340; 108 figures, 27 plates.)

[5] *Thérapeutique clinique des maladies de l'estomac et des symptômes associés.* Par L. Pron. Paris: Maloine. 1914. (Med. 8vo, pp. 274. 6 francs.)

[6] *Diseases of the Stomach, including Dietetic and Medicinal Treatment.* By George R. Lockwood, M.D. London: H. K. Lewis. 1913. (Med. 8vo. pp. 630; 15 plates, 126 engravings. 25s. net.)

two at most after they have been put to bed, but they are willing to remain until they are discharged. The relapse is, we believe, due more to want of care in dieting themselves after they leave hospital than to premature discharge. The author shows from statistics that the results of surgical treatment in ulcer of the stomach are not so uniformly successful as some surgeons would claim, and it must not be forgotten that 8 or 10 per cent. die directly from the operation; in the hands of a few specially skilful surgeons this mortality may be reduced, but of those who recover from the operation the number in whom a permanent cure cannot be claimed varies with the operator, and is from 8 to 25 per cent. In the treatment of gastroptosis Dr. Lockwood advises the application of strapping according to a plan which seems indistinguishable from that originally devised by Glénard; the diagram illustrating it seems to be identical, yet this is called "Rose's belt"; elsewhere he describes the method of putting on a Priessnitz bandage, but not exactly as prescribed by its originator, and the modification is a doubtful improvement.

NOTES ON BOOKS.

VERY greatly increased attention has been given to fleas as well as to other insects since the part such creatures play in the spread of disease has been so clearly demonstrated. It is fitting, therefore, that one of the Cambridge manuals should be devoted to this ubiquitous insect.[7] Mr. RUSSELL, in the pages of his book on *The Flea*, treats the subject popularly, avoiding whenever possible technical zoological terms, though if these have had to be used they are clearly explained. A very good account of the life-history of the human and some of the animal fleas is given, and the part these insects play in the dissemination of plague is also suitably discussed. The little manual should be found useful.

"M. OSTON, M.D." has written a bright, readable, if not very exciting, story of student life in Edinburgh in the late eighties or early nineties of the last century. Several of the personalities in university circles at that time are painted so as to be easily recognizable by any one who knew the "auld grey toun" in these years; and some characteristic tales, not the most daring ones, are told of their idiosyncrasies, especially when in the examination hall. The Edinburgh landladies, and especially a certain Mrs. Choice-Jones, with an amazing vocabulary of new-created words, are amusingly portrayed. The story, which has the title, *Born in Blinkers*,[8] concerns three youths studying medicine; two of them propose, each in his own way, to the sister of the third, and she makes her choice in the old-fashioned manner. There is nothing "modern" about the story any more than there is anything "militant" about the maiden, and all ends happily. Elsa, the heroine, is delightful; and Rayner, the hero, goes along all right when he gets his "blinkers" off.

MOTOR CARS FOR MEDICAL MEN.

MOTOR CAR INSURANCE.

IN reference to a case recorded at page 1101 of our issue for October 25th, in which the underwriters of a policy refused payment on the ground that the damage incurred was due not to an accident but to a mechanical breakdown, a member suggests that the plaintiff must have been unaware of the advantages offered by the Medical Insurance Agency, established by a committee of members of the British Medical Association and the owners of the *Lancet* conjointly. Had he been aware of these advantages and availed himself of them, his claims for damages would probably never have been refused on such grounds as those indicated, and he would certainly not have had to run a risk of having to bring separate actions against five different individuals. The Medical Insurance Agency has made arrangements with several insurance companies for the issue of policies covering every form of accident to cars or their owners, or to third parties, incurred by the use of motor vehicles. These policies are specially suited to the needs of medical men, and can be obtained through the committee by members of the Association at a reduced rate. The secretary and agent of the Agency is Mr. Guy Elliston, 429, Strand.

[7] *The Flea*. By Harold Russell, B.A., F.Z.S., M.B.O.U. Cambridge: The University Press. London: H. K. Lewis. 1913. (Fcap. 8vo, pp. 132. 1s. net.)

[8] *Born in Blinkers: A Romance of Edinburgh University*. By M. Oston, M.D. London: Murray and Evenden. 1913. (Cr. 8vo, pp. 351. 6s.)

THE CYCLECAR AND LIGHT CAR SHOW.

SITUATION REVIEWED FROM THE MEDICAL MAN'S POINT OF VIEW.

By H. MASSAC BUIST.

THERE opens at Olympia, Kensington, on Monday next the second show promoted by the Cycle and Motor Cycle Manufacturers and Traders' Union at which the form of vehicle currently styled the cyclecar constitutes perhaps the chief novelty among the exhibits. A year ago it was needful to point out that, interesting as was the display as regards the mere matter of design, its value as an appeal to the medical man was concerned, was extremely limited by reason of the fact that comparatively few of the types of machines submitted had gone through adequate testing by use on the road. To give the cyclecar its due one must say, on the one hand, that during the past season various examples have put up such performances as 20,000 miles in twelve months, the accomplishment of the journey from John O'Groats to Land's End in thirty-four hours thirty-nine minutes, a petrol consumption test of eighty-seven miles to the gallon, and a run on the track at Brooklands for an hour, during which period seventy-two and a half miles were traversed. Of course, no one machine has done all these things. These are, instead, examples of what has been done in various directions by vehicles, some of them specially built for the particular performances in question, as distinct from standard machines. On the other hand, no light car reliability trials—and this is the thing that alone matters to the medical man—have been organized on any large scale by any of the big car organizations in which the machines, considered in the bulk, have figured in at all a striking fashion, such, for example, as would have called for wide notice in the general press.

WHAT HAS LED TO DISSATISFACTION.

The cyclecar, or light car movement, as it is now being alternatively styled, has yet to do things in reliability trials worthy of prominence in the world's press as distinct from that small section which is solely interested in making all its geese appear swans. True, there have been reliability trials of sorts in England and Scotland. Quite a lot of ado was made in the cyclecar organs of only a week or two ago, for example, of a one-day reliability trial wherein only 10 per cent. of the starters fell out of the running. We are supposed to consider that a wonderful thing. But, if we look at the matter from the mathematician's point of view, we come quickly to the surprising conclusion that if they had carried the test to ten days—which would be by no means too long for a real trial of reliability—at that rate there would have been exactly no finishers on the tenth day's run out of thirty starters on the first day! It is things like this that require to be brought to the notice of the medical man, who has no use for a machine, no matter how cheap, if it affords only a sporting chance of quite nine and a half days' service before it breaks down. He must have a vehicle that will be available month after month all the year round. This plain speaking is necessary, too, to get this new branch of the industry away from those who would adopt hothouse methods of cultivating it. It is essential that cyclecar producers should come into the open and engage in the severest possible forms of reliability trials, no matter what weaknesses they may reveal, because that is the only means of putting the new industry on a solid basis by making it serviceable to the public. The motor engineering genius of the country, like the manufacturing one, is fully equal to the task of solving the problem once the causes of failure have been exactly, therefore scientifically, determined through process of trial and failure. As it is, it is being said in general terms to-day all over the country that, as the result of a season's service in the hands of the public before the vehicles had been adequately tried by the manufacturers, the cyclecar movement is dead.

HOW THE SATISFYING VEHICLE WILL BE EVOLVED.

That, however, is quite wrong. No movement that has its cause of being in a widespread and permanent demand

on the part of the public can be killed by any one season, or any series of seasons of failure on the part of manufacturers to produce the required article. It will be within the recollection of most that the motor bicycle movement went through precisely the same phase. Early in the century, particularly on the part of foreign manufacturers, it came on for a spell faster than the car movement spread. Then there was a sudden collapse because the goods had proved unsatisfactory so repeatedly that the public had lost its confidence to purchase; and we were told the motor cycle movement was dead. So, indeed, it appeared for a time. But during that spell some wise men in Coventry in charge of the Triumph Cycle Company considered the causes of general failure and arrived at a simple solution. They decided that the thing to do was to experiment quietly in the design and building of a machine which should be good enough for themselves to use daily to take them to and from their business and for week-ends. When they had got the design right, and the right material for each part, they merely standardized the vehicle. The whole of the motor cycle movement as a permanent development dates from that clear-thinking method of attacking the problem. So it must be with what we are styling the cyclecar movement. The manufacturers must not shun ordeals to test reliability, but must go on experimenting and building machines that are good enough for themselves to use at all times the year round in any part of the country. When they have got the design and materials right there will be an even bigger boom in cyclecar production than there has been in the motor cycle industry. Of the future of the four-wheeled light road vehicle with two driven wheels there can be no manner of doubt. In the meantime, the most urgent duty is to insist that the medical man must approach with the utmost caution the proposal to acquire a cyclecar. Happily this year many machines have been very considerably improved as the result of twelve months' more experience by the manufacturers, including many months in the hands of the public.

What the Purchaser Should Seek.

The cyclecar starts with many advantages from the manufacturing point of view. In the first place, it must be standardized to the last detail; therefore, if the design and materials are right, the producer has every opportunity of giving the best value for money, because the public demanding this particular type of vehicle will accept standardization down to the colour schemes, just as it will when buying a bicycle. Cyclecars are practically all marketed with lamps and every form of equipment that is an essential before the machine can be taken on the road. While very appreciable improvement is observable in many directions in the matter of detail—improvement as the result of a year's development—the reason that greater progress has not been made is that manufacturers have gone in quest of the wrong form of competition, aiming at shining at hill-climbing for a given engine size, doing extraordinarily economical fuel consumptions, very fast speeds along the flat and so forth. Now the cyclecar starts as so light a machine that it really matters practically nothing at the moment if it is comparatively extravagant of fuel. It is so light, too, that at present it does not matter particularly whether it is exceptionally or only ordinarily efficient as a hill-climber as judged by the time factor. But it is essential to the medical man to know that, whether he wants to go uphill or downhill, or along the level, and though other folk on other machines may pass him on any of those occasions, that his vehicle will get him there every time without mechanical failure *en route*.

How Cyclecars have been Improved.

Perhaps the first improvement one notices as a general rule in cyclecar development this year is that water cooling of engines is on the increase; this should considerably enhance performances under the heading of reliability by preventing overheating troubles, which have been of comparatively frequent occurrence during the past season. There has likewise been a great increase in the exploitation of four-cylinder engines, which means that the power is furnished with a very much more even turning movement than with a two-cylinder type, ensuring a saving of mechanical wear and tear, including tyre bills, as well as a gain in luxury of performance. The vertical engine is, of course, practically universal in the case of four-cylinder machines. It is almost extraordinary to observe the extent to which motor car development is being reproduced in cyclecar design, as, for example, in the furnishing of particularly flexible joints between clutch and gearbox to isolate those details of the mechanism from the effects of frame flexion. Reliability, too, is being ensured by furnishing wider teeth and more ample bearing surfaces in the gearboxes, so that in the main there is some tendency for the weight of the cyclecar to be increased. But when it has its cause in such developments as these, it is to be praised. When a four-cylinder engine is employed, there has occasionally been some increase in power, while many of the two-cylinder machines have been made more powerful, for hitherto they have not been quite up to their work. In such cases as the Humber, in which the water-cooled two-cylinder model is now available by reason of such cooling, it is possible to increase the compression employed, and therefore to get more power out of the machine.

Gear versus Friction Power Transmission.

This question of not overtaxing the motors is further studied by furnishing gears that are lower than those formerly employed. It is a particularly praiseworthy development in face of the fact that, while theoretically the four-speed gearbox is desirable, the dictates of the price factor determine that it cannot be employed, therefore machines must be produced which will work with three-speed gearboxes without overstraining. It will be found in general that the cyclecars of 1914 will climb hills in an easier fashion than those of last season. The friction type of drive is not employed in many machines. The cone method is not employed as much as the principle wherein discs are set at right angles to one another. The Continental makers are rather more keen on the friction drive than are the British manufacturers. There is a more pronounced tendency to fit detachable wheels as standard, chiefly of the pressed steel type. Tapered bonnets are on the increase, and bodywork has been improved in two directions—by allowing more width and leg room, and by employing more solid structures to obviate the development of rattling.

FORMATION OF A CENTRAL ASSOCIATION FOR THE CARE OF THE MENTALLY DEFECTIVE.

It was inevitable that in the controversies raised by the Mental Deficiency Act when it was still before Parliament attention should be mainly focussed on the constitution and duties of the new authorities it was proposed to set up, and on the new powers over certain individuals that it was proposed to confer on them.

Now that those controversies have been settled by the passage of the bill into law and there has been leisure to survey the whole field of work in regard to the defective, in order to see how best to carry into practical effect the benefits sought to be conferred by the Act on this unfortunate class of individuals, the matter comes to be seen from a fresh standpoint and in a different perspective.

First, it has to be admitted that the provision of institution accommodation must necessarily be gradual, and that unless the problem be approached cautiously at first there is danger of waste and extravagance. In the next place, it is apparent that the Government grant of £150,000, together with a like sum from local sources, will not go very far in providing institutional care.

Moreover it is realized more clearly now that the compulsory modes of dealing with defectives apply to only a limited proportion of the total number, and that the duties imposed upon the local authorities do not by any means extend to the whole class of defectives. There will remain a large number of such persons who are neither in homes or institutions nor placed under guardianship for whom there will be no provision except through the continuance and multiplication of such voluntary agencies as have in the past befriended the children who have passed through the

special schools or watched the careers and advised the friends of feeble-minded persons struggling to hold a place in the world.

The Home Office in drafting the bill did not lose sight of this aspect of the problem and of the probability that for large numbers of cases not subject to be dealt with under the Act recourse would have to be made to voluntary workers if the whole ground were to be fully covered in a satisfactory manner.

At present the number of so-called after-care associations and care committees is small. They correspond for the most part to the localities in which special schools for defectives have been established under the Defective and Epileptic Children (Education) Act. Whether this Act is to be made compulsory instead of optional, as was proposed by the Government last session, seems now to be extremely doubtful in view of the opposition which would be raised to such a proposal by education authorities, but we have it on the authority of the Home Secretary himself that an amending bill of some sort will be introduced at the earliest possible moment.

In any case there will be a much more widely diffused interest in and need for the supervision of defectives of all kinds and it is expected that new voluntary agencies will be formed all over the country.

In order that work of this kind might be encouraged and assisted provision was made by Section 43 of the Act that

> where a society has undertaken the duty of assisting or supervising defectives whilst not in institutions under this Act, there may be paid to the society out of money provided by Parliament towards the expenses of the society in connexion with such persons such sums and on such conditions as the Secretary of State, with the approval of the Treasury, may recommend.

It is understood to be the intention of the Government to put these powers in operation, provided it is satisfied that the circumstances and conditions are such as to justify it in recommending a grant.

An intimation has reached the National Association for the Feeble-minded that the Board of Control would welcome the formation of some central body representative of the voluntary workers in this field with which the Board could communicate and confer. It seems probable, from precedents in other similar cases, that the Government would be more likely to entrust the administration of a grant under this Section to a central representative body of this kind than to separate local associations.

Steps were accordingly forthwith taken by the National Association to call such a body into being, and on November 15th a meeting was held at Denison House, London, S.W., to which representatives of every body engaged in voluntary philanthropic work for defectives were invited. To this meeting a draft scheme for the formation of a central association for the care of the mentally defective, prepared by a special committee of the National Association, was submitted. Mr. Pollock, K.C., M.P., who took an active part in the Parliamentary Committee which dealt with the bill, presided, and the scheme in its main outlines was adopted with very slight dissent and the association formally constituted.

The association will be built up on county and county borough associations consisting of representatives of all the constituted authorities and voluntary agencies concerned with defectives, medical practitioners, and other individuals specially experienced or interested in the work.

The central council will consist of representatives of the local associations above referred to, and of such separate associations or institutions now engaged in the work as may be deemed to be of such importance as to deserve special consideration, of representatives of subscribers to the association, and of co-opted members.

The objects of the local associations will be to assist in, and supplement the work of, and co-operate with the local authorities for the mentally defective—for example:

1. By undertaking the supervision (after-care) of defective children and adults leaving any schools, homes, or institutions, including State institutions.
2. By assisting in the provision of suitable guardians and visiting defectives under judicial guardianship.
3. By assisting in the boarding out of defectives under schemes approved of by local authorities.
4. By befriending or otherwise assisting defectives not dealt with under the Act.

The work devolving on the central council and its executive will be:

1. To form a representative central body with which the Government can communicate and confer if so desired.
2. To distribute Government and other funds.
3. To organize the work of caring for defectives outside institutions.
4. To stimulate activities for the care and control of defectives.
5. To promote the formation of county and county borough associations.
6. To arouse public interest.

Mr. Leslie Scott, K.C., M.P., has consented to act as chairman of the executive. His intimate knowledge of the Act and its objects, coupled with his personal powers and influence, will be a source of great strength to the council.

It may be well to direct special attention to one or two points in this programme. In the first place, the association proposes to deal only with defectives while outside institutions. These comprise, among others, defectives below school age; defectives of school age but regarded as ineducable by the school authorities; defectives leaving school but not made subject to the Act; defectives removed from institutions where they had been placed at the instance of a parent or guardian; defectives discharged from institutions or approved homes, or defectives of full age who are not subject to be dealt with under the Act—for example, feeble-minded women who may be pregnant but not in need of Poor Law relief, or feeble-minded persons who are giving way to drink without having become habitual inebriates; indeed, all feeble-minded adults it may be possible to save from becoming subject to be dealt with under the Act.

It is intended that such assistance should be given if possible through, and in harmony with, the parents, and it is believed that it would come in more welcome guise from the members of a voluntary association than at the hands of an official of the local authority. It must be remembered that the association will have no statutory powers, but it is thought that the local associations might usefully work with and for the statutory local committees in carrying out work that fell outside the duties of those bodies.

For the effective discharge and co-ordination of such work it is essential that funds should be available for office work and for travelling expenses of visitors and representatives on the central council, and this would be one of the first grounds for application for assistance from the Treasury.

There is much other work that might usefully be performed by such an association when once its local branches were spread all over the country, especially in the way of collecting information and statistics of those defectives outside the cognizance of the Act.

It was gratifying to note the general willingness shown at the meeting to sink individual interests as far as possible for the sake of unity of aim and general co-operation. The National Association and its affiliated societies have joined in the scheme, and also the great voluntary institutions for the mentally defective, as well as the various after-care associations as represented by their central body.

It was well said at the meeting by Mrs. Pincent, the new honorary Commissioner, in seconding the formation of the association, that the main difference in attitude between official and voluntary bodies was the tendency of the public local authority, when confronted with fresh legislation, to study an Act with a view to ascertaining what was the minimum that it must do; whereas the attitude of a voluntary body was to search the provisions of a statute with a view to finding the maximum that it might do. The harmonious co-operation of the voluntary agencies may in this work make good much that would otherwise be left undone, either as falling without the duties of the public authority, or as being beyond its reach in the first transitional period. It is in this spirit that the central association has been constituted, and for such purposes that it seems so eminently adapted.

THE GERMAN INSURANCE DIFFICULTY.

Extraordinary Meeting of the Berlin Medical Society.

The Berlin Medical Society (Berliner medizinische Gesellschaft) has rarely exercised the power which it possesses under its by-laws to discuss and pass resolutions dealing with matters of medical politics. But on Wednesday, November 12th, the position created by the refusal of the Federation of Insurance Societies to recognize the right of the doctors to organize the profession for the protection of the individual practitioner caused this scientific society to make an exception.

Professor Orth, who was in the chair, pointed out to an unusually large audience that the exceptional circumstances of the struggle between the insurance societies and the doctors had induced the executive of the society to deal with this matter. Speaking, he said, as a purely academic member of the profession, as one who did not practise, but who spent his life in the consideration of the scientific aspects of medical problems, he felt it to be his duty to ask the meeting to resolve to fight the managers of the insurance societies fearlessly and firmly. He then read the terms of the motion printed below.

Professor Kraus, who seconded the motion, said that general practitioners were fully justified in looking to their old teachers for assistance and guidance in the serious deadlock which had been brought about. They taught the students that there was no finer or nobler relation than that which existed between the patient and his medical adviser. But this ideal relationship could only continue to exist if the profession maintained its independence and its pride in this freedom. The doctor could only be independent in regard to social insurance when free choice of doctor was permitted, and when the dealings with the management of the insurance societies were regulated by the professional organizations to which he belonged. The insurance societies had no right to dictate terms to the doctors or to choose doctors for the patients. In conclusion, he exclaimed: "Remain united and firm, so that you may be able to preserve for your profession its indispensable freedom."

Sanitätsrat Dr. Munter, who spoke in the name of the general practitioners, had a very cordial reception. He spoke earnestly of the important part which the doctor had to play in the great social scheme of insurance, and asserted that the scientific and economic decline of the medical profession must follow the imposition of oppressive terms of contract practice. The number of professorial chairs in medical sociology was increasing, but would be useless if the laity rendered it impossible for the doctors to translate into action the knowledge obtained at the price of so much strenuous exertion. Thousands of insurance societies would be broken up on the 1st of January next, but the Legislature had not attempted to make any provision for the doctors who would lose by this. The insurance societies had formed themselves into unions or federations which were financially powerful, and were opposing all attempts at organization among the doctors. They pretended that they were unable to pay the fees prescribed for the treatment of the poor of Prussia some century ago, "... but no fee is too low for them to buy medical hirelings." The number of fighting doctors was small as compared with the number of managers of the insurance societies, but greater intellectual power had ofttimes won a victory. The motion was then put to the meeting and carried unanimously. It reads as follows:

> In consideration of the fact that the manner in which the insurance societies desire to regulate the relations between the doctors and the societies under the new State Insurance Order most seriously imperils the freedom and independence of the medical profession, both of which are absolutely necessary for the continued scientific education and for the beneficial activity of the doctors, in the interest both of the patients and themselves, the Berliner medizinische Gesellschaft joins wholeheartedly with the German medical profession in its struggle with the managers of the insurance societies.

Medical Association of Munich and District.

On November 5th the general meeting of the Medical Association of Munich and District (Aerztlicher Bezirksverein München) received a report of the proceedings of the special meeting of the Aerztetag of October 26th, and considered the advisability of entering into negotiations with the insurance societies and clubs of Munich and environs. There are thirty-nine such societies and clubs, and an invitation had been received from the union of these societies, or rather from a commission appointed *ad hoc* to discuss the whole question with the doctors. The first motion proposed called on the medical practitioners holding appointments to the railway insurance societies to take steps to ensure that the whole profession should share in the emoluments of these posts by the introduction of free choice of doctor. The present time was not regarded as favourable for negotiations, but it was considered desirable to put this appeal on record as an expression of opinion.

The invitation to a conference with the insurance societies was then discussed, and it was determined that the insurance societies should be informed that the doctors would not accept the same conditions for the local clubs, the other approved societies, and a special private club, and would only negotiate if the representatives of the societies and clubs were willing that the conditions should be separate and distinct. The private club mentioned is regarded with marked disfavour by the Munich doctors; it was started as a club for poor persons, and has in the course of years extended its operations far beyond this sphere.

Other resolutions were adopted, and the meeting ended at a late hour. The members appeared determined to carry their policy through, in spite of all difficulties.

The Position in Baden.

A conference has been held between the representatives of the insurance societies of the Grand Duchy of Baden and the doctors, under the chairmanship of a member of the Baden Ministry, Dr. Glockner. It appears that an earnest desire exists on both sides to come to a mutually satisfactory arrangement before January 1st. The medical representatives, however, made it quite clear that they were not authorized to sign any final agreement until acceptable terms have been offered to the whole profession in Germany. They were nevertheless prepared to negotiate up to the point of signing the agreement. The representatives of the insurance societies were not quite prepared to accept the terms without consulting their individual councils, and the matter was therefore left in this position. During the discussions the doctors further pointed out that the Government of Würtemberg several years ago so arranged the conditions of service for the medical profession under the Insurance Act that causes of dispute were eliminated. They also pointed out that the Government of Bavaria was about to take similar steps with the same end in view. They therefore requested the Government of Baden to follow the example of the two neighbouring Governments and take the matter into its own hands. Dr. Glockner stated that he was not in a position to give a reply to this demand, but seemed inclined to advise the Government of Baden to take this course.

The Insurance Institution of the Hansa Cities.

The annual report of the Insurance Institute of the Hansa Cities (Hamburg, Lübeck, and Bremen) for the year 1912 again offers the reader a wealth of statistical material which illuminates the method of providing institutional treatment for the insured sick and disabled persons and orphans of the districts. Among the various interesting points dealt with the following will be found to have particular significance both in Germany and in England at the present juncture. The number of applications for free institutional treatment under the Insurance Act has increased considerably since 1911, and now reaches 6,417. The institution agreed to bear the cost in 3,762 cases, and refused in 2,145 cases; in the remaining cases the application was either dealt with in some other manner, or a decision had not been reached on December 31st. Of the 3,762 persons treated under these conditions 1,974 were suffering from affections of the lungs. In 1,772 cases pulmonary tuberculosis was proved to exist; 945 of these were males and 827 females. The increase of tuberculous cases treated under the Act in the various institutes has been remarkable. Starting in 1893 with 4 cases, the number reached 1,000 in 1902 and 1.772 in 1912. In a separate table the number of persons treated for various other conditions for each year is given, and while in some cases—for example, rheumatism and other forms of arthritis—the increase has been gradual and steady,

in others—for example, asthma and anaemia—the number has remained practically the same. In spite of the increased activity of the institute, the cost of institutional treatment has decreased from 755,295 to 718,135 marks. It appears that part of this was due to a shortening of the period of treatment of the individual case, and part to special economy in certain sanatoriums. The daily cost of each patient varied from 3 marks 56 pfennigs at the Sanatorium Glückauf to 7 marks 35 pfennigs in the convalescent home at Gross-Hansdorf. In some cases there was a decrease and in others an increase, as compared with the previous year.

The results of the treatment of pulmonary tuberculosis appear to be good. The percentage of male patients treated six years previously for tuberculosis who were able to earn a living was 51, 52, and 51 in the last three years respectively, and of the female patients 62, 62, and 63. In other words, 51 per cent. of the male patients and 63 per cent. of the female were capable of earning a living after six years. The reports of the medical superintendents of the various institutions at which the patients were treated contain much detail of importance.

ROYAL COMMISSION ON VENEREAL DISEASES.

THE following is the official report issued to the press by the Secretary of the Royal Commission on Venereal Diseases:

At the first two meetings of the Royal Commission on Venereal Diseases, which were held on November 7th and 10th, preliminary evidence was given by Dr. Stevenson, Superintendent of Statistics at the General Register Office, and statistical evidence as to the prevalence of venereal diseases in the Royal Navy was given by Surgeon-General May, the Director-General of the Navy Medical Department.

Evidence of the Superintendent of Statistics, General Register Office.

Dr. Stevenson's evidence was concerned with the figures contained in the annual report for 1911 of the Registrar-General for England and Wales, and related mainly to the question of the reliance which might be placed on those figures as indications of the prevalence of venereal disease in the country.

Dr. Stevenson thought that although the quality of certification generally was improving, there undoubtedly existed a reluctance on the part of medical practitioners to certify venereal diseases as a cause of death, and that consequently the figures contained in the report were minimum figures. He agreed also that there were doubtless many cases of death indirectly due to venereal diseases which are not demonstrated by the tables of the report. At the same time he considered that although the figures do not express the facts, they bear some relation to the facts, and must be regarded as having a distinct comparative value. For instance, he attached importance to figures showing that the death-rate from syphilis in London is four times as high as in the rural districts, and that in descending the scale from the densely populated to the rural districts the death-rate becomes progressively lower.

Dealing with the question of improving certification, Dr. Stevenson strongly advocated a general system of confidential certification under which certificates of the cause of death would not be handed over to the surviving relatives.

Evidence of the Medical Director-General, R.N.

The Director-General of the Navy Medical Department gave figures extending over the period from 1905 to 1912. These figures showed evidence of decline both in regard to syphilis and gonorrhoea. The figures of the number of cases, and of the number of days lost through sickness for 1912 showed a far more accentuated fall as regards venereal diseases than for any other disease.

The Director-General considered that the reduction in the figures might be due rather to the better education of the sailor in health matters than to the diminution in the prevalence of diseases in the ports. He thought that the men had absolute confidence in their medical officers, and that concealment of the disease was practically non-existent. It is the practice in the Navy for medical officers to give lectures on hygiene to the men, and this system was beginning to show very good results, and the Admiralty had great hopes of it. With regard to invalidings from the service on account of venereal disease, the Director-General thought that the rather sharp fall in 1911, which was disclosed in the tables, should be attributed to improved methods of treatment.

LONDON SCHOOL OF TROPICAL MEDICINE.

AT a meeting held at the London Chamber of Commerce on November 13th it was decided that the City Subcommittee which was formed some time ago to raise a fund for the London School of Tropical Medicine should be dissolved, its work having been accomplished.

Mr. P. MICHELLI, in presenting the report, said the total amount collected to date was £71,444, and the amount available for the school, after deduction of expenses, was £70,431. The list contained the names of 1,500 contributors; £10,000 had been received from the Wandsworth Bequest and £5,000 each from Mr. Otto Beit and the Government of the Federated Malay States.

Mr. AUSTEN CHAMBERLAIN, who presided, in moving the adoption of the report, said that although the full sum (£100,000) asked for had not been obtained the amount received had rendered possible an extension of the school which was urgently required and had relieved its managers of the constant anxiety they had felt before. The money raised had been allocated strictly in accordance with the declarations made when the appeal was issued. Only £15,000 had been spent on bricks and mortar; this was the absolute minimum if the school were efficiently to discharge its functions. The Wandsworth Bequest, generously given to the fund by Sir William Bennett, in whose discretion its allocation was placed, had been devoted to the direct endowment of research. But that did not really indicate the full measure of what had been done for research, for the work of teaching and that of research were inextricably intertwined. It had been found possible to invest £39,000, the income from which would go to the general funds, and enable the staff to be strengthened and the purposes for which the school existed to be otherwise promoted. One other object was mentioned in the appeal—namely, provision for the proper nursing and treatment of persons returning from the tropics suffering from tropical disease who were not in a position to pay heavy expenses. This was rather delicate ground, but, thanks to the cordial co-operation of the medical staff and the medical profession, the authorities of the school had been able to arrange a satisfactory scheme. He was hopeful that the beds allocated for that purpose would prove not the least useful part of the work. Referring to the "Chamberlain Ward," endowed for cases of the kind just mentioned, he said that he was touched by that recognition of his father's great interest in the school, for he thought that Sir Patrick Manson and all interested in it would say that it would probably never have been founded at that time but for his father's active support and keen interest in it, and he was proud to be associated with his father in that connexion.

The report was adopted. A resolution to close the fund so soon as outstanding subscriptions promised had been received was carried, and the CHAIRMAN said he thought any scheme for a permanent committee for the collection of subscriptions should be left in the hands of the authorities of the school.

MR. J. N. LANGLEY, F.R.S., Professor of Physiology, Cambridge, has been elected a corresponding member of the Royal Bavaria Academy of Science.

THE authorities of the University of Bristol have received from Mr. George Wills and Mr. Henry Wills jointly a promise to contribute £5,000 towards the endowment fund of the university, and to pay the cost of a further extension of its buildings to the extent of £25,000. These gifts will bring up the total contributions made by these gentlemen to the university to £180,000, as some little time ago they provided £150,000 for the erection and maintenance of a block of buildings as a memorial to their late father, the first Chancellor of the university.

THE POSITION OF PRISON MEDICAL OFFICERS IN RELATION TO FORCIBLE FEEDING.

A meeting of members of the medical profession, called to consider the position of prison medical officers in relation to forcible feeding of suffragist prisoners, was held at the rooms of the Medical Society of London, 11, Chandos Street, W., on November 18th, under the chairmanship of Dr. W. Hugh Fenton. The assembly consisted principally of medical women, and numbered twenty persons.

The Chairman said the medical profession prided itself on saving human life and preserving health, but certain members had reconciled themselves to taking up a position under the prison administrators which required them to act in a way that was not consonant with the best traditions of the profession. Prison medical officers had to stand by and see women brought almost to the point of death, and advise the administrators at the Home Office the precise moment at which it was just safe to leave off so that the prisoners should not die. Surely as medical men prison doctors had another duty to perform—to consider how far they could safeguard the prisoners from injury to their health and mental condition. He could understand that prison officials might act in this matter from a mistaken sense of duty to the State as their employer, but he could find no explanation of the position of outside medical men who gave an opinion when confirmation of the prison doctor's view was required.

Dr. Flora Murray moved the following resolution:

> This meeting of registered medical practitioners agrees with the statement of the Editor of the British Medical Journal that "prison medical officers are faced with a divided duty, that which they owe to their patients and that which they owe to their official superiors; and that the Home Office has no right to place them in this cruel dilemma." It therefore calls upon the Home Office to cease to require the prison medical officers to act under the direction of the lay authorities in professional matters, and to abandon the practice of forcible feeding, which has proved futile and which is only continued as a punishment.

Dr. Murray said the medical profession was esteemed by the public not only because it was scientific and humane, but because it put the interest of the patient before everything else, and the relations between the two were confidential. Within a prison it was the State who consulted the doctor about the patient, and the regulations required the doctor to divulge to the State information obtained in the course of his professional work. The medical profession should not allow to pass unchallenged the statement of Sir Edward Troup in his letter to Sir Thomas Barlow that forcible feeding was comparable with medical treatment or the artificial methods of feeding resorted to in hospitals. The physical and mental condition of prisoners who had been forcibly fed showed that there was no comparison. It appeared to many of them that forcible feeding was used as a disciplinary or punitive measure. This idea was presented to Sir Thomas Barlow and he was very much shocked. He wrote to the Home Office, which also was shocked, and said it was a dreadful lie. She was sorry Sir Thomas Barlow had not availed himself of a pressing invitation to be present. Dr. Murray urged that it could not be argued that forcible feeding was used as a life-saving measure, because it was resorted to at the beginning of a fast when life was not in danger. As to the claim that it was used to prevent deterioration of health, her experience was that a person who fasted in prison and was forcibly fed compared unfavourably with a person who had fasted and had been allowed to do so unmolested. Forcible feeding had been resorted to because the Home Secretary did not know what to do with refractory prisoners; therefore forcible feeding was a disciplinary measure.

Dr. Frank Moxon, in seconding, said the responsibility of the medical profession rested on the question whether forcible feeding was useful or not. Mr. McKenna now admitted that forcible feeding was not devoid of danger, and was a highly objectionable proceeding. He referred to it as having a deterrent effect; in other words, medical officers were carrying it out as a punishment. Dr. Moxon said he regretted having to criticize members of his own profession, but he felt that prison medical officers were wholly to blame in having consented to become the instruments of the Home Office in this matter.

Dr. Elizabeth Wilks said that if doctors could not be employed by the State without being false to their professional responsibilities towards their patients, they should resign their positions.

Mr. Mansell Moullin regretted that the President of the Royal College of Physicians had written to the lay press giving a definite opinion on one side of a case only, deliberately excluding the other. He could only imagine that it was a case of inspiration, especially as the lay newspapers in question had permitted no answers to appear. The Home Office could not be believed, because it had been detected time after time in deliberate suppression of truth. Sir Thomas Barlow's letter was only valuable as testimony that he believed an official statement. He supposed no one—not even prison medical officers—believed that forcible feeding, whatever the original intention, was now carried on with the intention of preserving life. What could be said of a surgical operation that was abandoned in the majority of cases for fear it would kill? There could be no doubt that it was carried out as torture—to break down the prisoner's spirit and compel acquiescence in ordinary methods of feeding. It was just like the Inquisition of old. Prison medical officers were in a most unhappy position. He hoped that until the regulations were altered the prison medical service would be boycotted by all decent medical practitioners.

Dr. L. Garrett Anderson said the reorganization of medical work in prisons was a most important part of penal reform. For its own honour the medical profession should lead this reform.

Dr. Tschaikowsky said the point must be settled whether women in prison were patients or prisoners in their relation with medical officers. If the regulations permitted prisoners to leave prison bearing marks of grave assault by medical officers it was time that matters were altered. Why should medical ethics within prison walls be different from those outside? Medical officers in prisons were responsible for the present state of things, and their responsibility must be borne by the whole medical profession.

The resolution was put to the meeting and carried unanimously.

Letter of the President of the Royal College of Physicians of London.

The following is the text of the letter, referred to above, published in the *Times* of November 15th:

Sir,—During the past fortnight I have received a number of letters respecting forcible feeding of suffragist prisoners, and I have been urged, as President of the Royal College of Physicians, to use such influence as I might possess to enable the prison doctors to be relieved from the obligation of performing the operation in question in cases of danger from starvation. It has been asserted by my correspondents in the most confident terms that forcible feeding is employed at present not for the purpose of saving life, but as a punitive and disciplinary measure. If that were indeed the fact I should willingly join with my correspondents in condemnation of the practice.

But is it a fact? It appeared to me that the straightforward course was for me to apply directly to the Home Office for information on this point. The accompanying letter gives the reply which I have received from Sir Edward Troup, the Permanent Under-Secretary, and I am authorized to publish it:

Home Office, Whitehall, S.W.,
11th November, 1913.

Dear Sir Thomas,—I need hardly say that there is not an atom of truth in the statement that forcible feeding has been resorted to as a "punitive or disciplinary measure." That is a lie which has been deliberately propagated as part of the suffragist campaign. I have no doubt some of your correspondents have been brought to believe it, but those from whom it originated must be well aware that it has no foundation.

Forcible feeding has never been used in the prisons except when necessary as a medical measure; and even when it would have been necessary as a medical measure the Home Secretary has frequently relieved the prison authorities from that necessity by releasing the prisoner. Since the Home Secretary obtained power under the Act passed last April to release prisoners temporarily in case of ill health caused by their own misconduct, there have been only three cases of suffragists being forcibly fed. These three were all women awaiting trial on charges of arson, and it was practically certain from their previous history and from their own statements that if they were released on temporary discharge they would within a week or two begin to commit fresh outrages. One of them had been released four times, and on each occasion within a few days of her discharge was arrested for a fresh offence of window breaking or of arson. At the present moment no woman is being forcibly fed. One of the three resumed taking her food in the ordinary way; another was released when she succeeded in "regurgitating" the whole of her food, so that the feeding became ineffective; and the third when she showed symptoms of appendicitis, of which she admitted she had had previous attacks.

I may add that in all questions relating to forcible feeding we have been advised by a distinguished physician, whose experience of asylum work is exceptionally wide. He speaks in the highest terms of the skilful way in which the forcible feeding is carried out by the prison medical officers, who have nearly always asylum experience, and by the female warders. In a recent letter to me he said:

> I have seen the forcible feeding carried out in Holloway on several occasions, and I am certain that the wardresses do their work in a thoroughly efficient manner. The cases at which I have been present at the feeding have been scattered over a somewhat lengthened period, but in no one instance could the wardresses' work of holding the prisoner have been more humanely or efficiently carried out by asylum nurses. It is true that the resistance offered by the suffragists is at times great and skilfully effected, but in my opinion the wardresses are thoroughly competent to carry out their duties. . . . The difference between asylum cases and the prison ones lies in the

thought-out resistance which the suffragist offers, even when efficiently held by the wardresses.

I have shown this letter to the Home Secretary and he approves of it.—Yours sincerely,

EDWARD TROUP.

Sir Thomas Barlow, Bt., K.C.V.O., F.R.S., M.D., etc.

Having regard to the above authoritative statement I submit (1) that there is at present no forcible feeding of suffragist prisoners; (2) that since April only in three cases of suffragist prisoners has forcible feeding been employed; (3) that there is no foundation for the statement made by all my correspondents that forcible feeding is employed as a punitive and disciplinary measure. I fail to see any reason why I should intervene by criticism or condemnation.—I remain, Sir, your obedient servant,

THOMAS BARLOW.

10, Wimpole Street, Nov. 14th.

LITERARY NOTES.

THE November number of the *British Journal of Dermatology* is the twenty-fifth anniversary issue of that excellent periodical. The occasion is celebrated by special articles. Sir Malcolm Morris, Dr. J. J. Pringle, and Dr. James Galloway contribute brief but interesting retrospects of the periods in which they successively held the reins as editors. Since the end of 1904 Dr. J. M. H. Macleod has been editor. During the twenty-five years the *British Journal of Dermatology* has been in existence many contributions recording memorable advances in the knowledge of skin diseases have appeared in its pages. In the present number Dr. Macleod relates a case of xanthoma tuberosum multiplex, associated with tumours about the joints; the paper is illustrated with well-executed plates. Dr. J. H. Sequeira gives the results of a study of four cases of multiple idiopathic pigment sarcoma (so-called) of Kaposi.

We have received the first number of the *Aberdeen University Review*, founded with the approval of the Court and Senatus of the University. It is conducted by a Committee of Management, consisting of six members elected by the University Court, six by the Senatus, and twelve by the General Council, together with the President of the Students' Representative Council, and five other persons co-opted by the committee. There is an Editorial Subcommittee, of which the convener is Mr. Alexander Mackie, who will be assisted by Mr. Robert Anderson and Mr. W. Keith Leask. The other members are: Professors Grierson, Arthur Thomson, and Baillie; Mr. P. J. Anderson, Mr. Stewart Thomson, and Miss Williamina Rait. There is also a Business Subcommittee, of which Mr. W. Stewart Thomson is convener. The foreword, by the Very Rev. G. Adam Smiles, Principal of the University, states:

> The *Review* is not to be regarded as the official organ of the University. But the constitution of the Committee of Management, and the support of all the governing bodies of the University, ensure that it shall be representative of our academic life in every direction. The contents will comprise summary records of the proceedings of the Court, the Senatus and the Council, with notices of all educational and administrative changes, as well as of new grants, gifts, and bequests; detailed accounts of the various departments and curricula, with reports of special studies and researches, abstracts of notable papers and lectures; studies in the history of the University; biographies and bibliographies; occasional reports from other universities; correspondence on University questions; and articles on letters, philosophy, science and education.

In addition to such things which form the *farrago* of every university magazine, those reponsible for the conduct of the new review will endeavour "to inspire our own with the memories, the atmosphere and the genius which are peculiar to Aberdeen." Lord Kennedy contributes an article on the Chancellor of the University, Lord Strathcona; Mr. Andrew Carnegie writes appreciatively, using what he calls the reformed spelling, of Mr. Bryce; Sir James Donaldson gives an interesting account of Aberdeen Universities magazines of 1849 and 1850; Sir W. Robertson Nicoll gives a vivid sketch of the homes of the rural students; Principal Iverach writes with knowledge and sympathy of William Robertson Smith, and Professor Arthur Thomson is eloquent on the wonder of life. Among the other contents are sonnets (reprinted) by Thomas Hardy and William Watson; an ode (Let us Take Hands) in commemoration of the federation of the South African States, by Dr. Ronald Campbell Macfie, and snatches of verse by Mr. Charles Murray. Other articles on various subjects, reviews and personal notes, fill up the number. Altogether it is an excellent start, and we congratulate the begetters of the *Aberdeen University Review* on the result of their labours. They have mixed the *utile* with the *dulce* so skilfully as to make a most readable compound. It should be added that the periodical is well printed and turned out in good workman-like style.

A Society of Humanist Doctors has just been formed in Paris for the purpose of bringing together members of the medical profession who take an interest in literature in its connexion with the biological sciences. The new society is intended to promote by all means in its power the revival of classical studies, and especially to counteract the deliberate abandonment or neglect of the humanities in the curriculum preparatory to the study of medicine. Among the members of the new society are Drs. Wickersheimer, librarian of the Academy of Medicine; Georges Petit, of Paris; Cabanès, editor of the *Chronique Médicale;* Monin Vallon, of Contrexéville, Le Grix, Berchon, Lucien-Nass, Hahn, librarian of the Faculty of Medicine, and Vérette. The general secretary is Dr. Berchon, 12, rue Jacob (VI^e^), Paris.

The October number of *Bedrock* contains, among other interesting articles, one entitled Some thoughts on the State punishment of crime, by Sir Bryan Donkin; one on vitalism and materialism, by Dr. Charles Mercier; notes on the struggle for existence in Tropical Africa, by Dr. G. D. H. Carpenter; and one on the control of venereal disease in England, by Mr. J. Ernest Lane. The whole number is well worth reading by all who are interested in the progress of science. The periodical is excellently printed, and the writers deal with their subjects in a lucid and popular style, without any sacrifice of scientific accuracy.

L'Hygiène for October contains an article on small-pox and war by Dr. Robert Wurtz, in which he points to the improvement of the means of protection in the French army since 1870. Owing to the revaccination of men not only on the active strength but in the reserve and territorial, he says the French army now is as well protected against small-pox as the German. This is conclusively shown by the statistics for the last decade. He insists on the necessity of revaccination every ten years, and deplores the apathy of the French public with regard to this matter. Dr. Maurice de Fleury contributes a further article on neurasthenia. The first quality needed in a practitioner who has to treat neurasthenics is, he says, inexhaustible patience, and he hints that it is well if the doctor knows from practical experience what the sufferings of neurasthenia are. Another point is that the doctor must not drug the patient. Dr. de Fleury sums up the treatment in two main principles: First, to get rid of the organic troubles which underlie the condition; next, to break the bad habits of mind which have grown out of the physical trouble and establish "a harmonious and new discipline." Surgeon-Major Orticoni, head of the bacteriological laboratory of the Twentieth Army Corps, deals with the purification of drinking water in armies on campaign. M. Francis Marre, expert chemist to the Paris Court of Appeal, gives an account of alimentary hygiene as represented at the recent international exposition at Ghent. The illustrations, as usual, are very good; one picture in particular by L. Boilly, representing what may be called a vaccination scene in a private family, strikes us as admirable.

The first number of a new periodical entitled *La Medicina Opoterapica* has recently appeared. In his introductory article the editor, Dr. Zanoni, states that in his journal "there will pass before the eyes of readers the subjects of endocrinology—the doctrine of internal secretions which forms the scientific basis of opotherapy, considered and dealt with in all its aspects—clinical, physiological and pathological, human and experimental—and the matters included under the heads of general and special opotherapy (opotherapy properly so-called, serum-therapy, vaccino-therapy, biological diagnosis, etc.), which are, so to speak, the practical applications of endocrinology."

British Medical Journal.

SATURDAY, NOVEMBER 22ND, 1913.

THE EARLY DIAGNOSIS AND TREATMENT OF SYPHILIS.

By the courtesy of the authorities we have had the opportunity of observing the methods now followed in the Navy and Army for the early diagnosis and systematic treatment of syphilis. The aim of the new systems of treatment is eradication of the disease from the system, and this aim is reached in the majority of cases which can be brought under treatment in a sufficiently early stage. We are able to publish in this issue papers of a highly practical and informing kind from medical officers of both services having special experience in the treatment of syphilis by modern methods. Both papers merit the closest and most diligent study of every civil practitioner. There can be no doubt that the statistics on which they are based are as reliable as human care and forethought can make them, and the approval bestowed on them by such authorities as Professor Ehrlich, v. Wassermann, and Blaschko, both at the International Medical Congress last August and in their writings, are a testimony to their great value for the study and elucidation of many problems connected with the disease.

The outstanding feature in both reports is the stress laid on the very great importance of early diagnosis. All authorities are now agreed that syphilis in the earliest stage—that is to say, before naked-eye clinical manifestations are definite—is a curable disease, and that cure may be brought about without a very prolonged course of treatment. On the other hand, all are agreed that once it has invaded the system and produced a positive Wassermann reaction, which is evidence of such general invasion, absolute elimination of the spirochaete becomes a very difficult matter, and can never be guaranteed.

The responsibility that rests upon the practitioner who without energetic and repeated use of modern methods lightly dismisses the possibility of a syphilitic infection with the diagnosis—to take a common instance—of soft chancre is perhaps the weightiest of any in medicine at the present day. It is even greater than that attaching to a hasty or hesitating diagnosis in a case of suspected cancer, for in the latter case only the individual is injured, whereas an error in respect of syphilis has far-reaching consequences, which may not end with the first generation. It follows that every genital sore, no matter what its clinical appearance may be, should be submitted to adequate microscopic investigation. We think that, if attention is directed to the present issue of the Journal alone, the evidence is sufficient to establish this as an indisputable proposition. The time has come when every practitioner is under an obligation either to make himself familiar with the morphological appearance and methods of demonstrating the spirochaete, or, if his opportunities do not permit of this, then he is under an obligation to refer the case to an institution or an expert, as the case may be, when the one or the other is accessible. This may at first sight seem a strong statement, but we believe that every one who will examine the facts without prejudice will agree that it is true.

The military authorities at Rochester Row have set a great example by educating the soldier, so that he now readily presents himself for examination for even the most trivial abrasions of the penis; the same progress was reported at the Royal Naval Hospital at Chatham, where the men are in the habit of requesting to be treated with salvarsan as soon as they suspect that they have been infected.

The civil practitioner can do a great deal in the same direction among his private patients, especially now that the cloak of silence is everywhere becoming loosened, and it is to be hoped that the recommendations of the Royal Commission on Venereal Diseases at present sitting will eventually result in a campaign of public instruction and enlightenment, without which all legislation is foredoomed to failure.

The army still uses salvarsan, for reasons considered to be sufficient, but the naval authorities at Chatham have adopted neo-salvarsan exclusively, and have noticed no fall in the percentage of their cures. The solution of neo-salvarsan is somewhat easier for the unaided administrator to prepare, and its use is certainly no more dangerous than that of the original compound, at any rate in this climate and in cold solution. It is important that the injection should be given on an empty stomach, and that the bowels should have been moved in the morning. The after-treatment of injected patients is rest in bed for twenty-four hours, and although the naval authorities at Chatham confine them to the wards for three days, for the purpose of a daily estimation of the arsenic excretion in the urine, this is a counsel of perfection, and may be omitted without materially adding to the risk attaching to the treatment.

Every student and those members who read the Journal are by this time aware that salvarsan by itself is not a certain cure for syphilis in any stage. It must always be combined with the energetic administration of mercury by inunction or injection; the administration of mercury by the mouth is becoming obsolete. Surgeon Scott, R.N., is in favour of pushing the drug to salivation point, but the advisability of the proceeding is open to argument. There is, probably, no better method than that adopted by Colonel Gibbard and Major Harrison with such brilliant results at Rochester Row. Here every patient receives one or more complete courses, as the tenacity of his infection may be judged to require. A course consists of three salvarsan injections, between the first and second and second and third of which five weekly injections of mercurial cream are given—ten in all. Unless otherwise indicated, each salvarsan injection consists of 0.6 gram of salvarsan (=0.9 gram of neo-salvarsan), and each injection of cream contains a grain of mercury. There are many mercurial creams on the market, and one of the most satisfactory is a modification of Lambkin's, known as Adam's, which contains a grain in 5 minims. Mercurial creams must never be heated, for the metal is thus thrown out of suspension, and over or under doses may consequently be given. All injections are given with proper surgical precautions.

The cure of syphilis implies an absence of clinical manifestations and serological reactions (even after a provocative injection of 0.2 gram salvarsan) over a period of at least one year from the last appearance of either, and the question of marriage, which is not

touched upon in either paper, is intimately dependent on similar reasoning. Cases are occasionally met with in which the blood reaction returns obstinately to the positive in spite of several intensive treatments. These are the despair of the syphilologist, and since they occur almost entirely among patients in the late secondary and tertiary stages of the infection, are one more argument in favour of the importance of early diagnosis. The longer such unfortunate patients can be prevented from marrying the less the risk of a trans-marital infection, and it is open to discussion whether, if such patients marry, their wives should not submit themselves to prophylactic treatment immediately after conception.

In cases which are known or suspected to have had syphilis, but present themselves for examination with a negative Wassermann reaction, Major Harrison employs a provocative injection of 0.2 gram of salvarsan, and then examines the blood forty-eight hours later, and again on the sixth and thirteenth days for a possible swing to the positive side. The proposition that a positive Wassermann reaction indicates the presence of living spirochaetes in the organism is now generally accepted, but unfortunately the negative reaction does not by any means prove their absence, for they may be lying latent or encapsuled in the tissues, or, as suggested by Ross and McDonagh, in some gametic form in the cell. The provocative salvarsan injection is of the highest importance in such cases, and may also be used as a test, in cases of secondary and tertiary syphilis which have apparently been cured and continue negative to the Wassermann reaction. By thus reactivating the luetic remnant, and then stepping in with a final energetic course of treatment there is good hope of stamping out the disease, and the certainty of preventing the probably imminent clinical relapse which may be about to manifest itself, possibly in the nervous system.

The facts now known establish the efficacy of the early treatment of syphilis by a considered plan such as has been worked out simultaneously in the British Navy and Army. That the treatment is so much more efficacious and sure in the early stage than after the infection has become generalized will not surprise the medical profession. It is in consonance with all that we know of other infections which begin locally and become generalized only after an interval. Fortunately, in syphilis this interval is relatively prolonged; it allows a reasonable time for diagnosis and for the remedy to act on the infective agent in its first focus. This circumstance casts a very great responsibility on the Royal Commission on Venereal Disease to report speedily, at any rate upon this part of its reference. One ground of urgency is the additional complication introduced into the practical aspects of the matter by the Insurance Act, and the complication will be aggravated by the clause in the new agreement which forbids a medical man to accept from an insured person on his list "any fee or other remuneration in respect of treatment which he is required to give."

If this condition is to be held to apply to syphilis, then special arrangements must at once be made for the diagnosis and treatment of the disease among insured persons. We say advisedly, first, that a practitioner engaged in insurance practice cannot reasonably be expected to have the special skill and special apparatus to enable an early microscopic diagnosis to be made with the requisite certainty and speed. Secondly, the drug can only be administered by the practitioner himself, and the injection demands special skill and very great attention to many details, all involving much expenditure of time and the use of special apparatus, which is necessarily costly.

Further, it is to be noted that the treatment will, under existing conditions, make a very serious call on the drug fund. The dose of salvarsan used in the army is 0.6 gram, and the retail price of this quantity in the current catalogue of a firm of pharmaceutical chemists is 8s. 6d. net. As three such injections must be given, the minimum cost for each case will be £1 5s. 6d. Even if special wholesale terms could be arranged the cost would approach £1, to take a low estimate. The Government specifically refused to except venereal diseases from medical benefit under the Insurance Act. We are not arguing that the refusal was wrong, but we do contend that the consequences of the refusal must be faced.

We have dwelt first upon considerations arising in respect of insured persons because the State has accepted special responsibilities in regard to them. But speaking generally the same considerations apply to all general practice among the industrial and poorer classes. The ratio of cases among the dependants of insured persons is probably lower, possibly much lower, than among insured males, but the importance of early diagnosis and efficient treatment is not less. Early diagnosis may be more difficult in women; but this fact only renders more imperative the provision of adequate facilities.

To the questions thus raised the Royal Commission ought to give immediate attention. It will find no difficulty in making a report dealing with them at least a month before the opening of the next session of Parliament, so that the Government may have proper time to consider the recommendations it will make to the House of Commons for the provision of an adequate scheme for the early diagnosis of syphilis and the systematic treatment of the disease in its earliest stage among the civil population.

THE INTERNAL SECRETIONS AND REPRODUCTION IN THE FEMALE.

FORMERLY—some time ago it is true—a woman was a woman because of her uterus; then enlightenment came and it was declared that she was a woman by reason of her ovaries, and now with more enlightenment it has to be said that she is a woman on account of her ovaries *plus* her ductless glands, or, to use the new term, on account of her endocrinous organs. This, at any rate, seems to be the message to the medical profession which is to be received from Dr. Blair Bell's able paper read to the Obstetrical and Gynaecological Section of the Royal Society of Medicine on November 6th, a long abstract of which was published in the JOURNAL last week. The article contains much more than that, of course; indeed its content is so large that we can only comment upon things which seem to be of special interest.

There are two ways in which the ovaries and the endocrinous organs—as those which possess internal secretions are coming to be called—act in making a woman a woman, in impressing female characteristics upon her, and by preserving in their integrity the genital functions when these have been once established. This is a conclusion which follows upon an immense amount of research and clinical observation carried out by various observers, including Dr. Blair Bell himself. Its proof rests upon many facts, some

of which are not particularly capable of simple explanation; but two or three of them may be given. The ovaries, for instance, cannot be solely responsible for the development of female characteristics, for a rare individual is known to exist who has all the appearances of a woman, but whose abdomen is found to contain testes without any trace of uterus, Fallopian tubes, ovaries, or upper part of vagina. Probably, therefore, the development of the characteristics of the pure male and of the pure female is due to the action of all the internal secretions in association with that of the gonads. "Gonads" is, like "endocrinous," a somewhat unfamiliar term used in the article we are referring to. Gonads are the undifferentiated germ glands, serving either as ovaries or spermaries.

Again, at puberty it is not the ovary alone which determines the commencement of normal functional activity in the genitals. The ovary must be working in complete harmony with the whole endocrinous system if this is to be accomplished. Thyroid or pituitary inadequacy may cause the genital organs to remain infantile. From the other standpoint, absence of the normal atrophy of the thymus may likewise prevent the full development of the genital organs. It has been stated, for instance, that removal of the thymus in male guinea-pigs leads to rapid development of the genital glands. Yet, again, more than the ovaries are needed to maintain the female characteristics and functions. It is well known, of course, that removal of the ovaries is followed by uterine atrophy; but it has been shown by experiment that partial removal of the pituitary body brings about the same uterine change, and the taking away of the thyroid causes intense atrophy of the uterus, with, it is said, increased activity of the ovaries. Thus, an amazing complexity is introduced into the whole matter, and this complexity reaches its acme in pregnancy, when all this intricate mechanism is working at high pressure and in special circumstances.

By far the larger part of Dr. Blair Bell's paper is devoted to pathological phenomena in reproductive life, and to their interpretation as necessarily determined by the intrusion, so to speak, of the endocrinous organs into the physiological arena. Precocious and delayed puberty, derangements of sexual characteristics and genital functions, must all now be studied in connexion not only with excess or defect in the ovarian secretion, but also in reference to thyroid, pituitary, suprarenal, and thymus insufficiency or excess; and many of the conclusions and details given in the paper are of such interest that they call for careful and independent reading on the part of every doctor who is interested in these matters—and who is not? It must suffice us here to pick out two matters which have or seem to have a direct practical bearing. First, although the ovaries can no longer be said to reign paramount in the sphere of female genital physiology, yet they are still joint rulers, co-queens, so to say; therefore there is here no argument for their more frequent removal. Some of the other endocrinous organs may compensate in part for their loss; but they cannot be easily or safely spared, for they and the ductless glands constitute a complex system whose every part has a value, and the taking away of any part leads to results which are not fully known but are certainly not negligible.

Then there is the matter of treatment. This is a subject with many aspects; but let us take one only—ovarian insufficiency. In cases of ovarian insufficiency it has been customary to substitute for the lacking internal secretion ovarian extract given by the mouth; but, obviously, if the main contentions of Dr. Blair Bell's paper are sustained, this alone will be quite inadequate treatment, save in circumstances when a number of varying conditions favourably interact. He looks forward to a time when a combined extract will give a good result; but much must be done before we are able with confidence to mix together the various internal secretions to suit any given case of ovarian inadequacy with its puzzling complex of symptoms. Further, as Dr. Blair Bell admits, even then it must be an animal extract upon which we shall have to place our trust, for an autogenous extract or group of extracts must remain an impossibility so far as the human female is concerned.

These matters are of great interest, and the interest in them is not limited to the reproductive functions as such, for in every department of the experimental and clinical work which may and must be taken up the effect upon general metabolism will require to be considered. Any one of Nature's experiments upon genital metabolism necessitates a concurrent experiment upon the general metabolism, and conversely, any alteration in the latter will react upon the former. A last practical conclusion may be drawn: The management of no case of genital irregularity at any one of the transition and critical times in the life of a woman (birth, puberty, pregnancy, lactation, menopause) is other than a task of great complexity; and general irregularities at such times are very intimately associated with the special physiological divergences of the period. When success is now obtained it must be somewhat haphazard in its origin, and due to a combination of favouring circumstances of whose nature we are in some degree ignorant.

THE NON-PANEL COMMITTEE OF THE ASSOCIATION.

The Non-Panel Committee of the British Medical Association, at its first meeting, which was held on Wednesday last, made a protest against the terms of the Notice to Insured Persons to Select a Doctor issued a short time ago by the Insurance Commissioners. The notice began with the statement: "If you have not yet chosen a doctor (or approved institution), you must do so without delay." The use of the word "must" was clearly erroneous. There is no compulsion on an insured person to choose a doctor, although if he does not he runs the risk of incurring the disadvantages enumerated in the remainder of the paragraph from which we have quoted. The notice should have run: "If you desire to ensure medical benefit under the Act promptly when you require it, you should at once choose a doctor," and so on. If he prefers not to choose a doctor among those on the panel, it is quite open to an insured person to refrain from doing so, knowing that he may thus lose free medical benefit under the Act, but not sickness benefit. He will not lose medical benefit under the Act altogether if he applies to the Insurance Committee of the area to make his own arrangements and his application is sanctioned. The Non-Panel Committee went on to elaborate this point by entering its protest against the allocation of insured persons who have not chosen a doctor from among those on the panel, to some one of the doctors who has joined, and represented that such insured persons ought to be allowed, as individuals, to take advantage, if they so desired, of the provision of the Act of 1911 (Section 15 (3)), which gives an Insurance Committee power to permit any insured person to make his own arrangements. That the wholesale rejection in some districts of such applications was a blunder is now, we believe, generally recognized; the fear then displayed that

the Act might in this way be broken down—to quote the phrase then used—was not, in fact, warranted by the numbers actually desiring to take this course. The policy then followed was not only prejudicial to many doctors in certain neighbourhoods, but vexatious to insured persons and their employers. There seems to be no justification at the present time for persisting in it. A report of the proceedings of the Non-Panel Committee will be found in the Supplement, and it will be observed that it has elected Mr. E. B. Turner to be its Chairman and Dr. Buttar to be Honorary Secretary.

STATE SICKNESS INSURANCE IN NORWAY.

The introduction, in July, 1911, of compulsory insurance against sickness among the working classes in Norway has led to important changes in the conditions of medical practice. The Norwegian Medical Association, to which practically every doctor in the country belongs, was well organized when negotiations between this body and the Government were carried on; and the credit for the excellent discipline in the ranks of the association is largely due to its energetic secretary, Dr. Rasmus Hansson. The terms, demanded by the association and conceded by the Government, include free choice of doctors, and payment in proportion to work done, a scale of charges being drawn up which varies somewhat according to the conditions obtaining in different localities. For one district the following charges have been adopted: Kr. 2[1] for a first consultation; kr. 1.50 for subsequent consultations, unless these exceed ten, when the fee is kr. 1. An additional fee of kr. ½ is charged for consultations out of regular hours; kr. 1 for renewal of a prescription without examination of the patient; kr. 2 for a certificate of health, and kr. 2 and 1.50 for extraction of a tooth, with or without local anaesthesia respectively. For massage, electrical treatment, and microscopic examinations, which are classed as consultations, a minimum fee of kr. 1.50 is charged. Kr. 3 to 5 is charged for minor operations, such as incision of a whitlow or removal of a foreign body, kr. 6 to 50 for major operations, exclusive of travelling expenses and the cost of bandages, etc.; kr. 1.50 for local and kr. 5 for general anaesthesia; kr. 10 to 40 for the treatment of abortions and confinements, exclusive of travelling expenses; kr. 3 for medical attendance 1 kilometre away in the country or 2 kilometres away in the town. The rate of payment per kilometre ranges from kr. 4 for 5 kilometres to kr. 13 for 25 kilometres. Apart from confinements and accidents, the fees are increased by 50 per cent. when medical attendance is required at night, on Sundays, and holidays, and when a visit is required during the regular hours of consultation. Travelling expenses for distances of more than 1 kilometre are paid according to scale. On the whole, these charges have been satisfactory to the medical men interested. The system of payment in proportion to work done is, of course, open to grave abuse; but this has largely been avoided by the appointment of medical referees, whose sole duty in connexion with the Insurance Act is the supervision of their colleagues' charges. In one town a referee worked out a table every month showing the expenses to the State of every doctor in his district. A copy of this table was sent to every doctor, a mark being put opposite his number. As no names were given, each doctor learnt what his cost to the community was as compared with that of his colleagues without discovering anything about his colleagues' business. One month a doctor who headed this list as the most expensive in his district, appeared in next month's list three places from the bottom—a sign that he had appreciably reduced superfluous work. The demand for medical attendance has risen rapidly, and whereas a few years ago many Norwegian doctors had to seek work abroad, they are now much in demand at home. Resident hospital appointments are often held by medical students, and the daily press has even protested against Norwegian surgeons giving their services to the Balkan States. Unfortunately the doctors' satisfaction with the present arrangement is not wholeheartedly shared by the rest of the community. In certain districts the yearly accounts show an unexpectedly heavy doctor's bill. Dr. Hansson has repeatedly urged on his colleagues the necessity of checking the abuse of free consultations; and it would seem that what may almost be called the orgy of free consultations has already abated. In the journal of the Norwegian Medical Association, Dr. B. Jensen and Dr. R. Hansson[2] show that in Christiania the doctor's bill fell from kr. 213,706 in the first half of 1912 to kr. 152,380 in the first half of 1913. The medical cost of each insured person has fallen from kr. 4.45 in the first half of 1912 to kr. 3.80 in the first half of 1913. The cost of medical attendance to the community is, however, still so great that a powerful agitation has been started in favour of a State medical service, with payment of doctors by a fixed salary irrespective of work done. The disadvantages of this system are obvious, and it is not likely to be introduced with the consent of the Norwegian Medical Association.

[1] 1 kr. = 1s. 1½d.

JUBILEE OF THE PASTEUR INSTITUTE.

On November 15th the twenty-fifth anniversary of the foundation of the Pasteur Institute, Paris, was formally celebrated. The President of the French Republic, M. Poincaré, who was accompanied by ex-President Loubet, M. Barthou (Premier), M. Klotz (Minister of the Interior), and the Presidents of the Senate and the Chamber of Deputies, presided at the ceremony. The only ladies present were Pasteur's daughter, daughter-in-law, and granddaughter. The President made an eloquent speech, in which he drew a picture of Pasteur venerated by all the peoples of the earth, and after extending the boundaries of life for future generations, passing away worn out with toil amid the sorrow of his own and all other countries. The President went on to say: "His memory remains, his spirit and his influence penetrate into the farthest and into foreign countries, where it is perpetuated by the leaders of science. His genius remains in this powerful and victorious institute, as do his memory and the example of his virtues." The Director of the Institute, Dr. Emile Roux, traced the history of the twenty laboratories, the three courses of instruction, the six departments of clinical treatment, and the five branch establishments of which the Institute consists. He paid a warm tribute to the influence of Madame Pasteur, who lies buried with her husband in the crypt of the Institute. M. René Valléry-Radot, her son-in-law, has recently published a sketch of her which, according to the Paris correspondent of the *Times*, is so admirable that it recalls in many respects Sir James Barrie's exquisite account of his own mother in *Margaret Ogilvy*. It would be superfluous at this time of day to describe in detail the work of Louis Pasteur, or to recite his innumerable titles to fame and to the gratitude of his fellow men. His work was indeed great, but the man himself was far greater. As Dr. Roux has well said: "The achievement of Pasteur is admirable; it displays his genius, but one must have lived in intimacy with him to know the whole goodness of his heart." The ceremony of Saturday last recalls the celebration of Pasteur's seventieth birthday on December 27th, 1892. The great theatre of the Sorbonne was filled, the places of honour being occupied by delegates of scientific societies, French and foreign, by members of the Institute, and by the professors of faculties, while in the amphitheatres were serried masses of students, members of deputations from the École Normale and the École Polytechnique, and from the schools of pharmacy, veterinary science and, agriculture. Pasteur entered leaning on the arm of

[2] *Tidsskrift for den Norske Laegeforening*, October 15th, 1913.

M. Sadi Carnot, then President of the Republic. The Presidents of the Senate and of the Chamber, the Ministers and Ambassadors took their seats on the platform. Behind the President stood, in their uniform, the official delegates of the Five Academies which form the Institute of France. The Academy of Medicine and the great scientific societies were represented by their presidents and permanent secretaries. The Royal Societies of London and Edinburgh sent, in the person of Lister, the homage of medical science. "You have," said Lister, "raised the veil which for centuries had hidden infectious diseases; you have discovered and demonstrated their microbic nature." Then came the historic embrace between the two famous men, which symbolized a brotherhood of science striving to lessen the sufferings of mankind. The scene is commemorated in a picture by Rixens which hangs on the wall of the Faculté des Sciences. When all the formal addresses had been delivered Pasteur replied in a speech in which he briefly passed his own scientific life in review. We may quote a passage from it as it is given in Valléry-Radot's *Life of Pasteur*, a book which should be read by every one who wishes to understand the great change that has come over the face of medicine in less than half a century: "Gentlemen," said Pasteur, "by an ingenious and delicate thought, you seem to make the whole of my life pass before my eyes. One of my Jura compatriots, the Mayor of Dole, has brought me a photograph of the very humble home where my father and mother lived such a hard life. The presence of the students of the École Normale brings back to me the glamour of my first scientific enthusiasms. The representatives of the Lille Faculty evoke memories of my first studies on crystallography and fermentation, which opened to me a new world. What hopes seized upon me when I realized that there must be laws behind so many obscure phenomena! You, my dear colleagues, have witnessed by what series of deductions it was given to me, a disciple of the experimental method, to reach physiological studies. If I have sometimes disturbed the calm of our Academies by somewhat violent discussions, it was because I was passionately defending truth. And you, delegates from foreign nations, who have come from so far to give to France a proof of sympathy, you bring me the deepest joy that can be felt by a man whose invincible belief is that Science and Peace will triumph over Ignorance and War, that nations will unite, not to destroy, but to build, and that the future will belong to those who will have done most for suffering humanity. I appeal to you, my dear Lister, and to you all, illustrious representatives of medicine and surgery. Young men, have confidence in those powerful and safe methods, of which we do not yet know all the secrets. And, whatever your career may be, do not let yourselves become tainted by a depreciating and barren scepticism, do not let yourselves be discouraged by the sadness of certain hours which pass over nations. Live in the serene peace of laboratories and libraries. Say to yourselves first: 'What have I done for my instruction?' and, as you gradually advance, 'What have I done for my country?' until the time comes when you may have the immense happiness of thinking that you have contributed in some way to the progress and to the good of humanity. But, whether our efforts are or not favoured by life, let us be able to say, when we come near the great goal, 'I have done what I could.'"

MOSQUITO CRUSADES IN ENGLAND.

THE sanitary authorities of some half-dozen small towns in the neighbourhood of Epping Forest are projecting an antimosquito crusade for next year. Their action might well be imitated elsewhere. In hundreds of villages and small towns throughout England the amenity of life in the summer and autumn months is diminished by swarms of gnats. Few people are totally indifferent to gnat and mosquito bites, and in some they cause quite serious degrees of irritation. Besides this, it is well known that some gnats, such as the *Culex pipiens*, are the bearers of a blood parasite highly inimical to many forms of bird life, especially finches. Nor is the possibility of the infection of human beings by the plasmodium causative of malarial fever to be overlooked. Nuttall, Cobbett, and Pigg Strangeways,[1] writing in 1901, showed that anophelids were by no means extinct in England. Without extending their investigation to the whole of Great Britain, they found anophelids at as many as 129 places, ranging in elevation from about sea level to as high as 700 feet. Though many of the localities were known to have been fever-haunted in former days, the reverse was sometimes the case. The anophelids found were of three species: *A. maculipennis*, *A. bifurcatus*, and *A. nigripes*, the former—elsewhere a well-known plasmodium carrier and haunter of inhabited localities—greatly predominating. All three species were most numerous in low-lying land containing many ditches, ponds, and slowly-flowing water; but the authors' observations indicated that the prevalence of anophelids varied considerably in different years. They suggested that the main reason why malaria no longer occurred in England was that, thanks to increased cultivation of land and connected drainage, anophelids were never present in such great numbers as formerly, though it was also possible that some intermediate host of the plasmodium had been extinguished. Malarial fever, it may be noted, was quite common in many parts of England until about sixty years ago, and in one village in Norfolk was said to be observed from time to time during the first decade of the present century. In one case under the care of Dr. Burton Fanning in the Norwich Hospital, in 1907, Dr. S. Long examined the blood and found the *Plasmodium malariae*. The patient had resided in Norfolk all his life. Curiously enough, no anophelids were found during the recent investigation of the Epping Forest district, but it was admittedly undertaken at a somewhat late period of the year. It was conducted by Dr. E. H. Ross, at the request of Dr. Stanbury Brook, medical officer of health for Chingford, who had determined to rid his district, if possible, of the reproach launched against it at times of being more mosquito-ridden than many tropical towns. His energies resulted in the holding of a conference of delegates of Epping district authorities on September 23rd. At this the decision to undertake a crusade was reached after Dr. Ross's report had been read. Dr. Ross found that the blood-sucking insects in the Epping Forest area were three species of *Culex*—namely, *C. pipiens*, *C. nemorosus*, and *C. cantans*—and that they bred, for the most part, in the waterbutts and gardens of the inhabitants of the townships concerned. The large expanses of water in their neighbourhoods were free from larvae, and there were only a few breeding places in Epping Forest itself. On this account the remedies suggested were for the most part of the simple and inexpensive kind commonly adopted in dealing with domestic causes of mosquito prevalence, such as the filling in of water-holes and the weekly emptying of waterbutts. It was recommended also that the river Ching should be cleared from floating obstructions to its stream, and that large ponds should, if necessary, be treated either by oiling or stocking with mosquito egg-eating fish, such as goldfish and "millions." Encouragement of the existence of bats and swifts was also mentioned as likely to be useful. All the remedies, in short, were easily adoptable and sound, with the possible exception of the use of "millions." Belief in the utility of these small fish rests mainly on the fact that certain West Indian islands, whose waters are full of them, are free from mosquitos; but any real relation between these facts has been denied, we believe, by Watson and others; while the circumstance that some collections of water give rise to hosts of mosquitos, and others, apparently of the same order, to none at all, has been credibly ascribed to

[1] *Journal of Hygiene*, vol. i. 1901, p. 4.

differences in their chemical constitution rendering them suitable or unsuitable to larval life.

THE HISTORY OF SYPHILIS IN ALSACE.

ACCORDING to the *Bulletin de la Société Française d'histoire de la Médecine*, the first detailed information as to the appearance and rapid spread of syphilis in Alsace is due to Matern Berler, a priest of Rouffach, and to Trithenius, Abbot of Spanheim. Berler wrote in the sixteenth century a chronicle in German, the manuscript of which was preserved in the library of the city of Strassburg. Referring to the Italian campaign of Charles VIII, King of France, in 1494 and 1495, Berler mentions the occurrence in the French camp of a disease which nobody had observed till then. It was called the "bad pox," or French disease. It was imported into Alsace by soldiers returning from Italy, and made many victims among the people because the method of treating it was unknown. Some died of exhaustion from inability to feed themselves. These unhappy beings were treated as outcasts, and many of them, not knowing where to find a shelter, sought for it in country chapels. As there was a certain resemblance between the disease and leprosy an attempt was made at Rouffach to get the patients admitted into the leper-house. The lepers, however, although partitions were put up to separate them from the syphilitics, resisted this proposal so strenuously that it had to be abandoned. Berler looked upon the disease as a punishment inflicted by heaven on Charles VIII for having robbed the Emperor Maximilian of his betrothed, the Duchess Anne of Brittany. Trithenius says the disease was brought to Germany after passing through France and Italy. "It began in France among the French and spread to the Italians, then to the Germans. But the epidemic had originated in Spain; the Spaniards gave it to the French, these in their expedition against Alfonso, King of Naples, gave it to the Italians, who in their turn infected the Germans. Hence the scourge was called the Spanish disease by the French, the Neapolitan disease by the Italians, and the French disease by the Germans. It is a strange and terrible contagious affection; even the lepers hold it in horror, and will not allow those affected with it to remain among them. They fear to be smitten with a disease worse than leprosy." All the chronicles of the time about Strassburg, those of Sebastian Franck, Kogman, Specklin, Trausch, etc., give the date of the first appearance of syphilis in that town as 1495 and 1496. A number of persons were infected at Strassburg, and many died as no one knew how to treat them. People held aloof from the sufferers, and the magistrate forbade public-house keepers and innkeepers to receive them, and surgeons and bath-men to treat them. The hospitals and leper-houses were shut against them; all communication with them was forbidden. They languished in misery in a remote quarter of the town (Thomanloch or Thumeloch), lying on straw, men and women huddled together. Only one man, Caspar Hofmeister, took pity on these unhappy people. He visited them and sought to arouse public pity on their behalf; he urged their pitiful case on the attention of the chief magistrate. For a long time the only funds for their maintenance were obtained by begging, the magistrate allowing only firewood. But these alms, wisely administered, enabled Hofmeister between 1503 and 1505 to acquire a house in the quarter of the town named Finckwiller. He there established a hospital, adding a court and a garden in 1506. This hospital was removed about 1520 to the island situated "near the covered bridges." It was enlarged in 1522 by the acquisition of a neighbouring house, and in 1538 the magistrate granted it the revenues of a suppressed Carmelite convent. Hofmeister organized and managed the various institutions intended for syphilitics from 1503 to 1532, the year of his death. One of the first works on the French disease was by the celebrated Alsatian jurist and poet, Sebastian Brandt. This was an elegy addressed by him in 1496 to John Reuchlin, called Capnion. The author draws there a dreadful picture of the disease, which he says has been spread through a large part of Europe and into Asia. The chief cause of this sudden dissemination of the disease is, it is said, to be found in the terrible depravity which prevailed in all classes of society in the fourteenth and fifteenth centuries. In Geneva, and in Nürnberg, and elsewhere, the prostitutes elected from among themselves a superior known in the former city as the Brothel Queen. They had a monopoly which enabled them to prosecute all women who infringed their rights by practising prostitution without a licence. In Strassburg special quarters were assigned to them. Some were lodged in the towers of the cathedral and other churches; hence they were known as the "Swallows of the Cathedral." About 1521, however, they were ejected from these sacred precincts. About 1540 brothels were suppressed, but clandestine prostitution continued to spread the evil. The archives of Strassburg show that the municipality of the city was constantly striving to cope with the disease throughout the seventeenth and eighteenth centuries. There seems to have been no medical examination of public women in Strassburg till 1815 or 1818, when the Mayor ordered that they should submit to inspection once a month. The regulation of prostitution dates from 1853.

EUGENICS AND GENIUS.

WE have several times pointed out that if enthusiastic eugenists had their way there would be a danger of mankind being reduced to a dead level of healthy animalism, owing to the gradual extinction of the "sports" known as genius. In his *Portraits and Sketches* (London, William Heinemann, 1912), Mr. Edmund Gosse, in a study of Swinburne, has some remarks on this subject which are so much to the point that it may not be amiss to quote them. He says: "The physical conditions which accompany and affect what we call genius are obscure, and have hitherto attracted little but empirical notice. It is impossible not to see that the absolutely normal man or woman, as we describe normality, is very rarely indeed an inventor, or a seer, or even a person of remarkable mental energy. The bulk of what are called entirely 'healthy' people add nothing to the sum of human achievement, and it is not the average navvy who makes a Darwin, nor the typical daughter of the plough who develops into an Elizabeth Barrett Browning. There are probably few professional men who offer a more insidious attack upon all that in the past has made life variegated and interesting than the school of robust and old-fashioned physicians who theorize on eccentricity, on variations of type, as necessarily evil and obviously to be stamped out, if possible, by the State. The more closely we study, with extremely slender resources of evidence, the lives of great men of imagination and action since the beginning of the world, the more clearly we ought to recognize that a reduction of all types to one solid uniformity of what is called 'health' would have the effect of depriving humanity of precisely those individuals who have added most to the beauty and variety of human existence." He goes on to say: "At present there seems to be an almost universal confusion between morbid aberration and wholesome abnormality. The presence of the latter amongst us is, indeed, scarcely recognized, and an unusual individuality is almost invariably treated either as a subject of disease or of affected oddity. When the physical conditions of men of the highest celebrity in the past are touched upon, it is usual to pass over them with indifference, or else to account for them as the results of disease." In illustration Mr. Gosse cites the instances of Pascal, Pope, Michael Angelo, and Tasso. With regard to the constitution of Swinburne, he says it was one of the most extraordinary that have been observed in our time. "It would be a pity if its characteristics

should be obscured by caricature on the one hand, or by false sentiment on the other. In the days when I watched him closely I found myself constantly startled by the physical problem: What place has this singular being in the *genus homo?* It would easily be settled by the vague formula of 'degeneration,' but to a careful eye there was nothing in Swinburne of what is known as the debased or perverse type. The stigmata of the degenerate, such as we have been taught to note them, were entirely absent. Here were, to the outward and untechnical perception at least, no radical effects of disease, hereditary or acquired. He stood on a different physical footing from other men; he formed, as Cowley said of Pindar, 'a vast species alone.' If there had been a planet peopled by Swinburnes, he would have passed as an active, healthy, normal specimen of it. All that was extraordinary in him was not, apparently, the result of ill-health, but of individual and inborn peculiarity." Yet Maupassant's description of the poet, which Mr. Gosse admits to be accurate, certainly does give an impression of "degeneracy." On the body of a child, says the French writer—a body without chest or shoulders—rested an enormous head. The vast brow rose like a dome above a small face ending in a pointed chin. The piercing eyes and the retreating mouth suggested a reptile. The whole body was shaken with nervous twitchings; every movement was jerky, as if the springs of the machine were out of order. This, doubtless, is a picture offensive to every instinct of the eugenic mind. Yet the world might more easily spare a regiment of eugenically perfect bumpkins than the neurotic "degenerate" Algernon Charles Swinburne.

DRUGS IN THE ROUGH.

Something of Eastern aroma, a subtle odour of Sultans, and palm-trees, and Othmanli quinces, clings to the idea of a wholesale drug market, and an occasional suspicion of this romantic touch lightened the lecture on drug markets at home and abroad with which Professor H. G. Greenish inaugurated the new session of the Pharmaceutical Society on November 11th. His lantern views were the result of two years' wanderings with his camera among the dock warehouses of London, Amsterdam, Rotterdam, and Hamburg. These warehouses must be as fragrant, in parts, as those ivory palaces which the Psalmist endowed with scents of myrrh, and aloes, and cassia, although only in respect of size are the modern depositories palatial. Our drugs chiefly come by way of the port of London, being disembarked at the London Docks, the St. Catherine's, or the riverside wharves. Professor Greenish found one warehouse, just beyond the Tower, stored with Indian senna, Japanese ginger, nutmegs from Singapore or the West Indies, and also cinchona bark, though the trade in this last has passed over very largely to Amsterdam. In this warehouse the nutmegs are sorted over, and the broken ones picked out and used for mace and volatile oil. Here also the bales of cinnamon, each in its gunny casing, are opened, their quality is inspected, and, with the aid of a kind of nutmeg-grater on the quills, the aroma is made more perceptible. Cinnamon is supposed to be an antidote to mercurial poisoning, and large quantities of it are exported from London to the quicksilver mines of Spain. One warehouse at the docks is occupied almost solely with tragacanth and isinglass, and another with resins. One drug, for its unpleasant odour, is kept in quarantine, even on Thames-side. This is asafoetida, which comes from Afghanistan and the Punjab, and has its own quay. The packages in which it arrives weigh from 1 to 7 cwt.; each has a gunny wrapping on the outside, and within this is a wooden case lined with tin, enclosing the black, stiff, pasty masses of the asafoetida. The substance is emptied out on the floor of the warehouse, and indeed the whole floor for one-eighth or one-quarter of an inch in depth is paved with the residue of successive importations. Even outside the warehouse and along the quay are to be seen heaps of asafoetida covered with tarpaulin. A considerable number of drugs are not handled and sold at the docks, but come up to the town warehouses of the Port of London Authority in Cutler Street. The topmost of the six stories of the old East India Company's warehouse is given over to such drugs as are not sold at the docks. Here one may find myrrh in curious matt packings; aloes in "monkey" skins; cases of benzoin from Siam, which are opened and the contents divided with a cross-saw, so that the evenness of quality may be judged; gamboge, also from Siam, and dragon's blood from the Malay archipelago; elemi from the Philippine Islands, and great bales of sarsaparilla from Central America, each of them sealed with raw cowhide at the top and bottom, and bound together with cowhide thongs. Not all the drugs, however, which come to the market are sold by inspection of packages; a great number are sold by sample, the samples drawn at the docks being brought up for exhibition at Mincing Lane. After the sale the drugs are removed by the purchasers, but before they reach the hands of the pharmacist they are subjected to a careful process of handling in order to separate extraneous substances which may be the result of careless collection or intentional admixture. Thus every piece of myrrh is examined, and if necessary broken, so as to determine whether or not it is genuine, before it is passed on to the retailers. Senna leaves and pods are carefully picked over, and opium is searched for lead shot and other heavy material. The pharmacist, as Professor Greenish pointed out, is indebted to the wholesale druggist for standing between him and the wily native, who often skilfully sophisticates the drugs he collects.

WOMEN AS MISSIONARIES OF HEALTH.

In these days many women who find, with Sir George Cornewall Lewis, that life would be tolerable but for its amusements, are looking about for some worthy object on which to exercise their missionary zeal. It is admitted by the most bigoted antifeminists that there are numerous things which women can do more efficiently than men. One of these is the propagation of the gospel of social hygiene. The *Gentlewoman* has done well to call the attention of its readers to this field of activity. We agree with our contemporary that there is a crying need for a great campaign in every town and village in the land in the promotion of social hygiene, and that no class is better fitted for this work than intelligent women of the leisured classes. Even in these days of universal education the mass of the people is grossly ignorant of the fundamental facts concerning the preservation of health. The medical profession does its best to enlighten the public mind, but it would be greatly aided in its work of fighting disease if people knew more as to the aims and methods of rational medicine. In this it could be immensely helped by the co-operation of women who would spread the light of hygienic knowledge and dissipate the mists of ignorance. As we have often pointed out, it is deplorable that, notwithstanding all that has been done to free the human mind from error and superstition in regard to health and disease, people are still to so large an extent led astray by quackery and delusion. The waste of money on remedies advertised by men who trade on human ignorance and credulity is the least of the evils arising from this cause. Worse than that are the harm done by such remedies, the creation of legions of sufferers from imaginary diseases, the delay in seeking proper advice, and the final dashing of the hopes excited by the confident promise of impossible cures. Doctors who denounce quackery are often accused of jealousy; this charge could not be brought against women who voluntarily devoted themselves to the

work of saving the people from the consequences of their own stupidity. Without fussy interference in domestic affairs, they could insinuate useful truths, and their natural tactfulness could persuade where the dogmatic teaching of the doctor might fail. A vast field of work, beneficial alike to the people and to the community, is open to women who will help in the war against disease. They could instil sound elementary notions as to health into the children and by gentle persistence remove mischievous errors from the minds of the mothers. In this way they would clear away many of the prejudices which lie as stones of stumbling in the way of the doctor as he goes about his work. We hope the suggestion of the *Gentlewoman* will fall on fruitful soil.

THE CLERGY AND CREMATION.

Although the Church of Rome shows no sign of changing her attitude of determined disapproval of cremation, other churches are less unbending. It is particularly gratifying, for instance, to note that the clergy of the Church of England is becoming, if not positively friendly, at least less actively hostile than it was not many years ago. A conspicuous example of the change of feeling is shown in the charge delivered to his clergy by the Bishop of Rochester in his cathedral on November 11th. In it he declared that the future of cremation was assured however people might shrink from the idea. Why any one with the least power of imagination should shrink from the idea of a rapid and cleanly disintegration more than from that of a slow corruption, which is a dishonour to the dead and a possible danger to the living, we cannot understand. But we are satisfied with the fact that a bishop has expressed the conviction that cremation will prevail. So certain is he that he discusses the way in which the Burial Service should be used when a body is cremated. Should it precede the act of cremation, or, following it, be associated with the interment of ashes? There are difficulties, says his lordship, both ways. Some of these, being purely ritual in nature, are outside our province. But the chief difficulty in the ecclesiastical mind lies, we gather, in the disposal of the ashes. Are they, asks the bishop, to be left to the mercy of the official at the crematorium, or to be carried about by friends on journeys, or to be interred in some spot without any prescribed religious ceremony? Where is to be the ultimate resting place of the remains? Why not, we ask in return, in the columbarium? Or why should they not be buried in the grounds of the crematorium? Those at Golders Green, for example, could easily be adapted to the purpose, and could be transformed into a "God's acre" as comforting to human sentiment as a country churchyard, without the horrible suggestions of decay inseparable therefrom. We most heartily agree with the bishop that the place of interment should be kept a sacred spot for the pious care of relatives. We are sure that much of the prejudice against cremation would disappear if, as the bishop suggests, the religious service were made to centre not on the act of cremation but upon the subsequent interment of the ashes, the urn being treated just as the coffin is in the present ceremony. This is what we have always felt, and we confess we cannot see any difficulty in the absence of the body, which we believe is considered a vital objection by the Roman Catholic Church. In conclusion, we cannot do better than quote the words with which the Bishop of Rochester closes his reference to cremation: "The practice will undoubtedly grow, and we should be prepared to secure that it be not associated with any carelessness on the religious side. It may help us ultimately to a closer connexion with Christian hope than in these days of vast and crowded cemeteries. The rule which excludes from Westminster Abbey all interments but those of cremated ashes indicates that our cathedrals and our churches may, like our closed churchyards, once more become the resting places of our sacred dead under the very shadow of the Church."

AN AMERICAN RADIUM INSTITUTE.

A national radium institute has recently been founded at Baltimore. The president is Professor Howard A. Kelly, of Johns Hopkins; the vice-president, Dr. Curtis F. Burnam, of Baltimore; the secretary and treasurer, Dr. Archibald Douglas, of New York. The institute has been established for the purpose of procuring a sufficient amount of radium to conduct extensive experiments in the treatment of disease. Investigations will also be carried out regarding the physical characteristics and chemical effects of radium rays, in the hope that possibly the effects of the rays may be produced by physical means. A radium clinic will be established at New York. There will apparently be no difficulty in obtaining a sufficient supply of radium. The *New York Medical Journal* of November 8th announced that Professor Kelly and Dr. James Douglas, an engineer of New York, had jointly bought twenty-seven claims of mining land rich in carnotite deposits in Paradox Valley, Montrose County, Colorado, and the radium there procured is to be used solely for philanthropic purposes and mainly for the treatment of cancer. It is not to be in any way a money-making scheme, and funds will not be accepted from outside sources. The American Bureau of Mines, in virtue of an agreement, will have the opportunity of a scientific and technical study of the mining and concentrating of carnotite ores, and of the most efficient method of obtaining radium, vanadium and uranium therefrom, with a view to increasing this efficiency and preventing waste. Nearly a hundred tons of high-grade carnotite have already been procured from the claims in Paradox Valley, which are regarded by experts as among the richest radium bearing regions in the world. Dr. Parsons, the President of the United States Mining Bureau, stated, in making the announcement, that not one cent of the radium to be extracted would be for sale; every milligram of the metal would be used in the cause of humanity. He added that the Bureau of Mines had evolved an entirely new method of extracting radium chloride which would materially reduce the cost.

On the occasion of the celebration of the twenty-fifth anniversary of the foundation of the Pasteur Institute, Paris, the pupils and friends of Dr. Emile Roux, the Director, presented him with a medal bearing his effigy. Although he declined to sit for his portrait the likeness is said to be very good. The presentation was made by Professor Metchnikoff, and Dr. Roux took the opportunity of sending a fraternal greeting to all his old pupils and friends.

During the last two and a half years the medical staff of the Local Government Board in England has been deprived by death of three of its senior medical inspectors—Drs. Bulstrode, Darra Mair, and Sweeting; during this period Dr. Theodore Thomson, C.M.G., assistant medical officer, retired on account of ill health; and Dr. H. Franklin Parsons, assistant medical officer, shortly after his retirement under age-limit regulations of the Civil Service, died as recently as October 29th last. The small expert staff of the Medical Department of the Local Government Board can ill afford to lose these men of ripe experience. The excellence of their work had matured after long apprenticeship under distinguished masters— the late Sir George Buchanan, the late Sir Richard Thorne, and Sir William Power. Their appreciation of the sanitary and social conditions of the country had been acquired by constant travel over it in the execution of their duties. Their "field work" had brought them into intimate relation with problems of water supply, sewage disposal, housing, and industrial occupations, and with endemic and epidemic disease. From personal knowledge of these matters they were in a position to tender invaluable advice to those who sit in judgement at Whitehall. These five men were distinguished members of our profession, and their work has been of the utmost value to the State.

England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

LONDON.

London County Council.

Dispensary Treatment of Tuberculosis.

In connexion with the preparation of a comprehensive scheme for the treatment of tuberculosis in London,[1] the Public Health Committee on November 18th invited the London County Council to decide the general principles upon which it will approve of local dispensaries to be administered by the borough councils. It was proposed that a borough council should make arrangements to pay for patients residing in its district who attended dispensaries attached to hospitals in any part of London, and the following were the conditions which the Council should require to be observed in any local scheme for the provision of dispensary treatment:

1. The Council must be satisfied that the premises are suitable.
2. The scheme must include provision, either in the dispensary or at a hospital working in connexion with the dispensary, for the diagnosis of ordinary straightforward cases and of incipient, anomalous and difficult cases specially referred on the ground of difficulty of diagnosis.
3. The physician in charge of the dispensary (or "tuberculosis officer") must be a man of experience, not only in dealing with tuberculous affections, but also in general medicine.
4. Proper records and statistics in connexion with the work of the dispensary shall be provided of the nature and in the form required by the Council, and approved by the Local Government Board.
5. The physician in charge of the dispensary shall supply to the medical officer of health of the borough from which the patients are drawn such information as the medical officer of health may reasonably require, and the county medical officer of health shall be entitled to receive this information from the borough medical officer. The physician in charge of the dispensary shall also furnish the requisite information to any medical practitioner carrying out domiciliary treatment, or, in a case which is referred to a sanatorium, to the medical officer of the institution.
6. The scheme shall include provision for home visitation of patients, either by the dispensary physician or by the medical officer of health of the borough or his staff, and for the examination by the dispensary physician of such cases as the medical officer of health or a medical practitioner may require, either at the dispensary or in the homes of suspects and contacts.
7. The scheme shall be conducted with reasonable economy, and the expenditure shall be annually submitted to the Council for its approval.
8. The scheme shall provide for distinguishing clearly between the cost of treating insured and uninsured persons, having regard to the opinion expressed by the Council that insured persons shall not be paid for out of the rates.

The report was approved.

Control of Lying-in Homes.

The Midwives Act Committee reported, with reference to the decision of the Council to promote legislation for the control of lying-in homes and institutions,[2] that, as the Council had decided to proceed by means of registration in the case of nursing homes and massage establishments,[3] the Committee thought it best to withdraw its proposal to license lying-in homes and to substitute the policy of registration. The Committee understood that the Home Secretary would oppose an application for any powers more stringent than registration.

The Council decided to seek parliamentary powers on the lines recommended by the Committee.

Provision of a Street Ambulance Service.

With reference to the decision of the Council to make all possible use of existing agencies for the purpose of establishing an ambulance service for London,[4] the General Purposes Committee recommended:

> That the Metropolitan Asylums Board be invited to prepare and submit to the Council for its consideration a detailed scheme, with estimates of cost, of co-operation with the Council and other authorities in the establishment in London of an efficient ambulance service for street accidents.

[1] British Medical Journal, November 8th, p. 1252.
[2] Ibid., August 9th, p. 343, and October 25th, p. 1111.
[3] Ibid., November 15th, p. 1326.
[4] Ibid., November 16th, 1912, p. 1419.

Mr. P. A. Harris moved an amendment to substitute for the recommendation the following:

> That inasmuch as there is no authority in London which has the necessary stations or appliances with which to commence a satisfactory system of ambulances for street accidents, and as the cost of supplying and working the same must be a charge on the county rate, a special committee be appointed to consider and report forthwith as to the best methods by which the Council itself can organize an ambulance system on the lines now worked by the Corporation of the City of London, and as to the cost of bringing such a system into operation.

Mr. Harris said that almost every important town in the world except London had an up-to-date ambulance system. The question had been before the County Council for twelve years, and nothing had been accomplished, although every one recognized the urgency of the matter. If ever there were an ambulance system in London it would be due more to the persistent energy and enthusiasm of Sir William Collins than to anyone else. The number of accidents in the streets had risen from 10,000 in 1904 to 17,000 in 1907, and 20,000 at the present time.

Mr. J. D. Gilbert, who seconded, said the committee's proposal only meant further delay. He was informed by the city authorities that the cost of the two ambulances used there was £1,487, excluding the cost of the drivers, or in round figures, £2,000 per annum. At that rate a service of twelve ambulances could be provided in the rest of London for £12,000.

Mr. Ernest Gray, chairman of the committee, urged that the Council ought first to try and co-ordinate existing organizations. The Metropolitan Asylums Board declared that it could organize for a large part of London an efficient service; the hand litters attached to hospitals were the most convenient appliances for dealing with accidents happening near a hospital. It was not suggested that the ambulances used by the Asylums Board for infectious cases should be used for street accidents; it would be a comparatively small matter to purchase ambulances; the point was that the stations of the Board and its organization should be used.

The Rev. Dr. Scott Lidgett pointed out that if the organization of the Asylums Board were used it would be necessary to build isolated stations to overcome a natural prejudice on the part of the public. The Council had all the material for preparing a scheme itself, and in such a scheme the Asylums Board service could be co-ordinated. The Council would have to pay the whole of the cost, and it had no means of securing representation on the Asylums Board.

Mr. W. H. Ecroyd, a member of the Asylums Board, hoped the Council would understand that if it handed over this work to the Board the scheme to be produced would be an absolutely new service. This was stated at a recent conference with the General Purposes Committee. Most of the existing ambulance stations were used for infectious cases, and it would be necessary to partition them off and make the accident department separate. The ambulances of the Asylums Board were unfitted for general accident cases; they were not suitably constructed, nor were they driven by electric power. If the Asylums Board had been given power by the Legislature to provide an ambulance service, it would never have shirked the responsibility and asked another body to carry out the work.

On being put to the vote in a thinly attended house, the amendment was lost by 36 votes to 17, and on a division by 66 votes to 44.

In the course of further discussion, Mr. R. C. Norman, Chairman of the Finance Committee, admitted that if it were found that the Asylums Board would have to promote an entirely new scheme there would be no point in their undertaking the duty in preference to the County Council. At present the Council did not know that this would be the case.

The recommendation of the committee was ultimately approved.

Medical Inspection and Treatment.

Some discussion took place with reference to a summary presented to the Council of the report of the school medical officer, Dr. Kerr.[5] In reply to various comments on the report, the Chairman of the Education Committee (Mr. J. W. Gilbert) said that dental treatment must

[5] British Medical Journal, October 25th, p. 1112.

necessarily proceed slowly, because it was not popular with either parents or children. He did not agree with members who had urged the advantages of the whole of the medical inspection staff being a permanent one. It would be a great misfortune if there were a large number of doctors the bulk of whose work was confined to the routine duties of inspection. He had hoped that a system of half-timers might be tried, but, failing that, he would like a very large proportion of the service to consist of doctors who were only appointed for a limited period. The doctors who undertook medical inspection should be kept in touch with medical treatment as far as possible. Mr. Gilbert indicated that a report on the conditions of the school medical service would shortly be forthcoming.

METROPOLITAN ASYLUMS BOARD.

Scarlet Fever: Shortage of Nurses.

The Hospitals Committee reported to the Metropolitan Asylums Board on November 15th that owing to the unusual incidence of scarlet fever this autumn it had not been found possible to admit immediately every case notified for removal. This was due to the fact that, although there were vacant beds ready for patients, the requisite nursing staff of the lower grades could not be procured. The medical officers were asked to furnish daily lists of the most urgent cases, and the immediate difficulty with regard to the nursing staff was being met to a certain extent by the engagement of a large number of institution nurses. The principal medical officer had been asked to report on the existing terms and conditions of employment of the nursing staff at the Board's infectious hospitals, with a view to discovering whether any alterations were necessary to render the service more attractive.

In reply to a question, the chairman of the committee, Dr. Elliott Browne, said that at the moment there was not a single metropolitan case outstanding, a great many having been dealt with since the report was prepared.

A return presented to the Board showed that on November 8th, out of 5,177 fever patients in the various hospitals, 3,699 were suffering from scarlet fever, as compared with 2,354 so suffering on the corresponding day of 1912.

Medical Superintendent of Darenth Industrial Colony.

The Finance Committee recommended that the salary attached to the joint office of medical superintendent of the Darenth Industrial Colony and mental specialist of the Bridge Industrial Home, made vacant by the appointment of Dr. Rotherham as a Commissioner under the Mental Deficiency Act, should be at the scale of £700 per annum, rising by annual increments of £50 to £900 per annum, with emoluments consisting of unfurnished house and washing. The chairman of the committee said it was anticipated that one of the Board's present officers would be able to fill the position, but several members urged that the appointment should be advertised, because the duties would become even more important owing to the passing of the Mental Deficiency Act. It was also suggested that the proposed salary was not high enough to attract the very best candidates. The question was referred back to the Committee for further consideration.

Scotland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

MEDICAL TREATMENT OF SCHOOL CHILDREN IN EDINBURGH.

AT a meeting of the Edinburgh School Board on November 10th the Health Committee reported that it had received intimation from the Education Department that the sum of £700 had been allocated to the board for the medical treatment of necessitous school children for the period to the end of January, 1914. Dr. Shoolbred suggested that the board might now reconsider its policy in this matter. But Mr. Murray said that unless medical treatment followed upon school medical inspection no service would be rendered, and he hoped the policy would not be disturbed. Mrs. Leslie Mackenzie, the convener of the committee, pointed out that the £850 received in the past year had been spent mostly in the board's own institution for the medical treatment of children, and the matter was allowed to drop. With regard to the treatment of ringworm and favus, it was elicited that the Lauriston skin disease school was not providing for all the cases, for whilst there was accommodation for 60 in the school 270 cases had been reported in the city. It was agreed that if the board had an *x*-ray installation of its own, it would be possible to put more children through the school.

A CANADIAN "HERBAL."

At a meeting of the Botanical Society of Edinburgh, held on November 13th, a paper was read on behalf of the Hon. W. R. Riddell, giving an account of the pharmacopoeia of the botanical physician eighty years ago, as described by Samuel Thomson, a "herb doctor," in his book published at Hamilton, Upper Canada, in 1832. Several books have been written on Thomson and his work. The following is the title of one published at Philadelphia in 1835:

The Thomsonian's Manual and Vade Mecum; being a synopsis of the theory and principles on which is based the botanic practice of medicine, as promulgated to the world by Samuel Thomson; and also a comparison of its simplicity, efficacy, and merits, as contrasted with the principles and practice of the mineral school of medicine.

MEDICAL MISSION WORK OF THE CHURCH OF SCOTLAND.

On November 12th Dr. Sargood Fry, of the Edinburgh Medical Missionary Society, presided at a sale of work under the auspices of the Invalids' Auxiliary, and Dr. Lechmere Taylor gave an account of medical missions in the Punjab. He said there might be an impression, in view of the many Indian medical students and the Government aid, that the need for medical missions was not pressing, but it had been computed that 100 millions of the people of India, more than twice as many as the inhabitants of the British Isles, were without the simplest medical aid; and the medical mission established the humane and kindly relationship without which they could not dare to speak to the people of higher things.

HENLEY AND LORD LISTER IN EDINBURGH.

A letter appeared over the signature "Archibald Constable" in the *Scotsman* newspaper for November 13th pointing out the debt of Edinburgh, and particularly of medical Edinburgh, to the poet Henley. The late poet's "hospital" verses, it is generally known, are really a poem on the Edinburgh Royal Infirmary, and the writer in the *Scotsman* asserts of them that they contain "such a picture of the staff, ways, methods, and scenery, so to say, of a great hospital as has been made in and of no other city." The "chief" (Lord Lister), the "staff nurse, old style," the "house-surgeon" (John Duncan), the "children," the "lady probationer," and the "visitor" ("bearing a sheaf of tracts, a bag of buns") are all enshrined in Henley's haunting lines. It was whilst the poet was still at the Crypt Grammar School at Gloucester that he began to have signs of the disease which sent him to Edinburgh and to Lister. The surgeon asked him why he had come, and the answer, given by L. C. Cornford in his life of Henley, was, in effect, "because the rest of the profession had declared that he (Professor Lister) was incompetent. Lister said nothing, but he saved the foot." The Crypt Grammar School has now in view the foundation of a Henley scholarship, and it may be that medical men of these past days, whether in Edinburgh or outside of it, will wish to help on this permanent memorial to the poet of the old infirmary, and indirectly to his helpful surgeon "the chief," who battled so well "with custom, prejudice, disease," and brought in a new era in the chirurgeon's art.

EDINBURGH HOSPITAL FOR WOMEN AND CHILDREN.

AT the quarterly meeting of the executive committee of the Edinburgh Hospital and Dispensary for Women and Children and the Hospice the appointments were confirmed of Miss Mary Rankine as Senior Resident; Miss Winifred Buckley as Junior Resident; and of Miss Jean Cuttle as Resident at the Hospice. The hospital is in Whitehouse Loan, and the dispensary is at 25, Grove Street. It was reported that the hospice, which is the maternity centre in the High Street, had been recognized under the Insurance Act for midwifery cases.

Ireland.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

History of the Rotunda Hospital.

At the last meeting of the Board of Governors of the Rotunda Hospital, the Master, Dr. Henry Jellett, presented to the board, in the name of Dr. T. P. C. Kirkpatrick and himself, the *Book of the Rotunda Hospital*. It forms the first comprehensive history which has been written of this world-known hospital. It deals with its subject from a very broad standpoint, so that it will be appreciated not merely by medical men, but by the layman who is interested in the history of Dublin during the Georgian period and afterwards. The profits of the sale of the book will be given to the funds of the hospital. The following resolutions were passed:

That the best thanks of the governors be given to Dr. Kirkpatrick and Dr. Jellett for the very able, interesting, and useful history which they have written of the hospital.

That Dr. Percy Kirkpatrick be proposed to fill the office of governor in recognition of his eminent service to the hospital in preparing the *Book of the Rotunda Hospital*.

Ulster Medical Society.

The annual dinner of the Ulster Medical Society was held in the Medical Institute, Belfast, on the evening of Thursday, November 13th. Mr. A. B. Mitchell, the President for the present session, occupied the chair. Among the guests were the Recorder of Belfast (His Honour Judge Craig); Dr. Fitzgerald, President of the College of Physicians of Ireland; Dr. Purefoy, President of the College of Surgeons of Ireland; Dr. J. Walton Browne, D.L., the new Honorary Fellow of the Ulster Medical Society; and Dr. Lawless (Armagh), President of the Ulster Branch of the British Medical Association.

After the usual loyal toast, Sir William Whitla gave a short account of the movement to present a portrait of the late Dr. Joseph Nelson, a former President of the Society, to the Medical Institute, and now formally handed over the picture to the trustees to hang on the walls of the institute. The President called upon Dr. J. Walton Browne, the life-long friend of the late Dr. Nelson, to unveil the portrait. Dr. Walton Browne, in doing so, said he had known Dr. Nelson for over fifty years; their acquaintance began when they were at school, and had grown into an intimate friendship which had lasted till death intervened. During Dr. Nelson's career as a student the Italian war of independence took place, and this bold and youthful student and some other kindred spirits offered themselves as volunteers, drilled in a small hall in Belfast, and left for Italy. Nelson was present at some of the engagements, for which he afterwards was awarded a medal and clasps. In later life he revisited the scenes of his early campaigns in company with Sir William Whitla. He returned home, completed his M.D. course, and sailed for India. He was in partnership with the late Dr. Coulter in tea plantations, but assiduously practised. He returned home and studied the specialities of the eye and ear, of which he already had considerable experience on the Continent. He was appointed to the Belfast Royal Hospital, and eventually became consulting surgeon under the rule as to age limit. Dr. Browne paid a high tribute to the character of the late Dr. Nelson, which was echoed in the hearts of most present, as they had known him so long and well.

Professor Lindsay, in an eloquent and humorous speech, proposed the toast of "Irish Medicine," which was responded to by Dr. Fitzgerald and Dr. Purefoy. Dr. J. Walton Browne was then admitted by the President to the roll of the Honorary Fellows of the Ulster Medical Society. It was, he said, the highest honour the society could bestow, and as yet it had on its list but few names. They all honoured and esteemed the new Fellow, congratulated him on the distinction bestowed on him by the Lieutenant of the city, and wished him many years of happiness. Dr. Browne replied. Mr. R. J. Johnstone proposed "Our Guests," which was responded to by His Honour Judge Craig and Dr. Lawless.

Sir Thomas Myles, who proposed "The President," said that Mr. Mitchell had been one of his most promising pupils, and he was delighted to see him verifying the prediction he had made. The President replied, and said how much the society owed Mr. Irwin, the Honorary Secretary, for all his trouble in the preparations for the evening, and proposed his health; Mr. Irwin replied.

New X-Ray Departments for the Cork Infirmaries.

Both the North and South Charitable Infirmaries in Cork are to be provided shortly with a modern installation of *x*-ray apparatus. The South Infirmary received a gift of £500 for the purpose from a donor who wishes to remain anonymous, and within the last few weeks the North Infirmary, on the recommendation of the medical staff, has decided to instal an apparatus of the latest pattern. The Committee of Management of the North Infirmary has appointed Dr. C. B. Pearson to be radiologist to the institution. Dr. Pearson, who is the son of Professor C. Yelverton Pearson, F.R.C.S., one of the senior surgeons of the North Infirmary, has received a special training in this work at the London Hospital. A subcommittee of the Board of Management of the infirmary was appointed to confer with a subcommittee of the medical staff, and bring up a report on the measures necessary to put the *x*-ray department on a proper footing.

Appointment of Tuberculosis Officer for Belfast.

At the meeting of the Belfast City Council on November 3rd Dr. Andrew Trimble was appointed chief tuberculosis medical officer at a salary of £600 a year. Dr. Trimble is to devote the whole of his time to the performance of such duties as may be required of him by the council in connexion with the prevention and treatment of tuberculosis, and is to reside in the county borough; the appointment is terminable at any time on three months' notice.

Dr. Trimble was formerly a member of the City Council, and was chairman of the Children's Committee; he has devoted much time and energy of late years to the tuberculosis question, and has studied personally the problems in London and Edinburgh. He has shown himself an able and energetic organizer, and his professional brethren offer him their hearty congratulations, and look forward to an advanced and scientific campaign against tuberculosis in Belfast.

Outbreak of Poliomyelitis.

At the last meeting of the Cookstown Rural District Council a report was read from Dr. Robert Burgess, J.P., medical officer of the Coagh Dispensary District, in reference to an epidemic of poliomyelitis in his district. There had been almost thirty cases, with four deaths. There had been no instance of two patients in the one household. Dr. Burgess has had the assistance of Dr. Brian O'Brien, one of the medical inspectors of the Local Government Board, who has paid two visits to the patients, and was on one occasion accompanied by Dr. Gardner Robb of Belfast. Both regarded the outbreak as serious. The ages of the four children who died ranged from 9 months to 11 years. All the schools in the district have been closed.

Alcohol in Infirmaries.

The Enniskillen Poor Law Guardians have appointed a committee to inquire into the amount of alcohol consumed in the local infirmary. The question was raised by a guardian, who held that an enormous amount of liquor was used in the workhouse, and argued that alcohol was destructive of health.

India.

[*FROM OUR SPECIAL CORRESPONDENTS.*]

The Countess of Dufferin's Fund.

The report of the National Association for Supplying Female Medical Aid to the Women of India for the year 1912, drawn up by Lieutenant-Colonel J. R. Roberts, C.I.E., M.S., honorary secretary of the Central Committee, indicates steady progress throughout the Indian Empire. The map accompanying the report shows that the operations of the fund embrace the whole area of British and native India. There are fourteen provincial branches in existence and active employment, and 140 local and district associations or committees. The number of hospitals and dispensaries in which women are treated by women is 190, and in these 1,297,428 patients were treated; 49 lady doctors, 97 assistant surgeons, and 434 hospital

assistants besides midwives and nurses are employed, and 557 women are studying or undergoing training. It is in contemplation to establish in Delhi a medical college hospital and training school for nurses in connexion with the fund. A scheme for the creation of a women's medical service for India is under discussion. Measures are being adopted for raising the pay and status of lady doctors and giving them greater independence. The finances of the fund are in a satisfactory position. The affiliated "Victoria Memorial Scholarship Fund" for the instruction and training of native midwives is also, under some difficulties, making substantial progress.

Special Correspondence.

BERLIN.

The Berliner medizinische Gesellschaft: Plans for its New Home.—Support for Insurance Doctors.

THE rapid increase in the membership of the Berliner medizinische Gesellschaft during the last few years has produced much the same state of uncomfortable overcrowding as was the case with the Royal Society of Medicine before its removal to Wimpole Street from Hanover Square. At a meeting last week in the premises which have for many years been held on lease from the Surgical Society—the Langenbeck-Haus—it was decided to commence on April 1st, 1914, the construction of a new and permanent home in the medical quarter of Berlin. This has been rendered feasible by an increasing subscription list and several generous donations to the building fund. The estimated cost reaches the large total of £87,500, and the municipality are guaranteeing a subsidy of £50,000 for the purpose on condition that a number of popular lectures on subjects connected with public health be annually delivered by members in its precincts. There is to be seating accommodation in its largest lecture hall for 900 persons, and the building is to be called by the names of those two great fathers of German pathology and surgery—the Virchow-Langenbeck-Haus. There will be plenty of room available for research laboratories, waiting-rooms for patients, a library with accommodation for 200,000 volumes, and reading rooms. A point of interest to English readers is the compliment paid to the founders and designers of the Royal Society of Medicine's premises, by a resolution to utilize the London building as a pattern. It is hoped that the new house will become the centre of medical Berlin.

The meeting then passed on to the business of the day, and unanimously adopted a resolution to support the doctors in their strenuous fight with the insurance societies. This attitude is all the more significant in that the Berliner medizinische Gesellschaft is a strictly scientific organization, and makes it a rule not to take part in any sort of medical polemic.* The chairman, Dr. Orth, who introduced the resolution, said that the doctor must never be allowed to become a servant, and that the high ideal which every physician had before him must never be allowed to deteriorate. He was supported by Professor Kraus—one of the most eminent of university professors on the teaching staff—who maintained that the true relations between doctor and patient could never be upheld so long as the patient was unable to select the man in whom he had confidence. This was impossible so long as the societies were able to choose their own men, to the exclusion of the rest of the profession. Dr. Munter, who represented the practitioners, and who has been very prominent in the efforts that are being made, spoke last and drew attention to the fact that whereas on the one hand the Government had instituted chairs of hygiene and social medicine, they were preventing by legislation the majority of medical men from putting their hard-won learning into practice.

* The meeting is referred to more at length at p. 1391, where the text of the resolution is printed.

DR. HANS KOHN, the assistant editor of the *Berliner klinische Wochenschrift* has received the title of Professor. Dr. Kohn has done valuable work as prosector of the Poliklinisches Institut of the Berlin University.

Correspondence.

WHOLE-TIME CLINICAL PROFESSORSHIPS.

SIR,—Your leading article under the above heading[1] appears at a most opportune time. We are apparently on the eve of an endeavour to revolutionize medical education in London. Last summer a committee of eight members was constituted to turn the report of the Royal Commission on University Education in London into a practical measure to ascertain how a real living working university could be evolved from the colleges, schools, and institutes which already exist within the metropolitan area.

I am concerned only with the medical or hospital schools; they clearly constitute the most difficult part in any scheme of university development. A close study of its report shows that the Commission was fully alive to the difficulty of making the hospital schools departments of the university. The present Minister for Education also realized these difficulties, for in the small Departmental Committee which, I suppose, is now at work, he included two medical men—a representative of clinical studies and another of intermediate medical subjects. If the work of this Committee is strictly circumscribed by the findings of the Royal Commission, if its sole business is a strict application of the conclusions of that Commission, then any advice or suggestion at this stage would be too late. A careful study of the Commission's report, however, leads one to suppose that the action of the Departmental Committee is not circumscribed or strictly limited. It appears to have powers of modification. For instance, on page 137 of the Final Report, it is stated:

> At the same time we realize to the full the many practical difficulties involved in making even a beginning of reorganization, and the exact method or line of advance may prove to be different in detail from that suggested here.

Again, on p. 133:

> The main thing is, that whatever steps are taken they should be taken with foresight, so that the system when once introduced could be developed naturally to its full expansion without waste.

Further, on p. 131:

> Without money[2] it will be impossible to do anything; but we must make our recommendation on the assumption that enough money will be forthcoming to allow at least a beginning to be made in the organization of medical education in clinical subjects which admit of natural development.

From those quotations it will be seen that the Departmental Committee, in the onerous task which now lies before it, is not bound hand and foot; it must formulate a scheme "with foresight"—one which can be "developed naturally to its full expansion without waste."

Let us look closely at the scheme which the Commission had in mind. It is the "hospital unit" scheme; four elements are essential to each unit:

1. A paid professor.
2. A suite of wards.
3. Paid and expert full-time assistants.
4. The means to conduct clinical investigation either in or near the wards.

Those who know the needs of the metropolitan hospital schools most intimately recognize at once that two of these recommendations—full-time expert clinical assistants at liberal salaries, and ample opportunities for clinical investigation and research—are boons too long deferred. At every hospital there are young men waiting—ambitious, able and willing to help in the advance of medicine—but the means and the opportunities are denied them because they must spend the very best and most profitable years of their lives in the routine of the medical school and hospital in order to earn enough to keep themselves in food and clothes. To those who know medical London best, it is not the waste of clinical material but of clinical ability that hurts most. The Commission realized that waste of medical ability, the

[1] BRITISH MEDICAL JOURNAL, November 8th, p. 1242.
[2] A sum of £36,000 annually is proposed for education in clinical medicine.

ability to extend and improve the foundations of medicine; but while it realized the waste it failed to grasp its importance, for in the programme of its recommendation the physician of to-morrow is altogether overshadowed by the physician of to-day—the professor. The professor is the main pivot on which its scheme of the "hospital unit" turns. To the writer he is the least important. If possible, the professor is to be an amply-paid, full-time physician, surgeon, or gynaecologist. The Commission frankly recognized the full-time professor as an impossibility in the meantime. It expressed its willingness to be content with part of his time; the remainder could be spent in private practice.

Let us look more closely at the reason the Commission gives for the appointment of professors. Take the Professor of Medicine for an example. He is to introduce the university spirit to his wards—the spirit of research amongst his students—that spirit which rouses the student, when he has reached the necessary point in his studies, to become a first-hand observer and inquirer. He is to be Professor of Medicine—to profess a first-hand knowledge of the whole gamut of medicine, from brain to skin. Such a professor is nowadays an impossibility. No first-rate physician or surgeon would undertake the drudgery of imparting to students knowledge he can only know at second hand. Three-fourths of his instruction would be taken at second hand. The advance of medical knowledge is such that no man, be he ever such a genius, could fill a chair of universal medicine; at the very best, if he is to keep up and keep his school up to a university standard—the standard the Commission insists so much upon—he can only profess that one section of medicine, the one to which he has devoted himself. That is a fact which the Commission failed to realize; yet any scheme which is based on three men—a Professor of Medicine, a Professor of Surgery, and a Professor of Midwifery and Gynaecology—carrying in their single heads the whole fabric on which medicine rests is antiquated and foredoomed to failure.

The Commission has made this blunder; it is to be hoped the Departmental Committee is not going to try to perpetuate it. If so, the chance of a lifetime is gone. Single professoriates are not only antiquated, they are impossible for London. The Committee must therefore fall back, if it would find a way out, on that clause of the Commissioners' report which states, "the line of advance may prove to be different in detail from that suggested here." It is not a matter of "may"; it is simply "must." If medicine or surgery are to be living subjects—growing, advancing subjects—they must be taught by the men who are advancing or specializing in each of its great branches. At least there must be one man for each of the four or five great divisions into which medicine in modern times has fallen. An equal division is necessary for surgery. Why call them professors? Would not university physician or surgeon be enough?

The proposal, then, is that the Departmental Committee, when it comes to establish relationships with one or more hospital schools, should try, not to obtain one unit for medicine, one for surgery, and one for obstetrics and gynaecology, but at least four units in each of the principal subjects. The details of how such a scheme can be applied must rest with the Departmental Committee and the authorities who control the hospital and attached schools. The first point the Committee has got to realize is that single professoriates are antiquated and absolute impossibilities in London.—I am, etc.,

November 15th. P.

Sir,—It would be fortunate if "W. O.'s" clear warning as to the possible dangers of whole-time clinical professorships and "W. H. W.'s" not altogether convincing attempt to allay his fears should arouse the teachers of medicine in London to the risk that is before them of a definite committal of their university to Mr. Flexner's ideal.

The profession is passing through a period of rapid and considerable change. Old methods of running hospitals and carrying on the clinical education of our students are not perfectly adapted to modern conditions, and seem likely to be still less satisfactory in the near future. Great changes are undoubtedly necessary, but all changes would not necessarily make things better. The particular change as to which "W. O." warns us, that it might be "very bad for the professor himself and for his students," and as to which "W. H. W." shows us, that it need only be applied to one-quarter of the teachers and one-half of the students, seems to me to be likely to make a good many things worse.

Every clinical teacher in each of the ten medical schools of London finds his work daily becoming more difficult and unsatisfactory for want of adequate machinery and co-ordinated effort to deal with the increasing complexity of medical science, and a reform is proposed which its supporters recognize can only, at the most, be applied to three out of the ten schools, and only to three out of the thirty or so clinical teachers at each of these three schools. "W. O." thinks it might be "very bad" even for these nine men and their pupils. "W. H. W." shows us how it might be possible to breed a healthy competition between the fortunate or unfortunate nine and their very numerous colleagues for whom this reform seems to be capable of doing little if anything else. "W. H. W.'s" proposal that the services of this small group of super-physicians and surgeons when established should be reserved exclusively for the particular social class who receive the charity of our hospitals, appears, as soon as it is put to the test of practice, so illogical that we are told that it has been arranged that the whole-time professors at Johns Hopkins are "free to see and treat any one inside or outside the hospital, but for such service they are to accept no personal fees." It is a difficult position. If these professors give their services free to all comers, however wealthy, there must be an awkward feeling that they are dealing unfairly with their colleagues, whereas if the hospital charges a fee for its whole-time professor's services a new terror of hospital abuse is introduced. So "W. H. W." proposes that they should do no private work at all. Now, unless these men become really better physicians and surgeons as a result of their improved and special opportunities, the scheme stands confessed a failure. If they become more competent men to deal with a particular class of case, the restriction of their services to those patients only who can claim hospital charity must come to be regarded as against public policy.

Altogether the proposal is of such doubtful advantage, it raises such troublesome problems of professional relation to the public, it is so extraordinarily expensive, it touches such a small fringe of the problem of the reform of medical education in London, and it is based on such a misapprehension as to the proper place of clinical instruction in the scheme of medical education, that it is earnestly to be hoped that we shall listen to "W. O.'s" warning, and, discarding Mr. Flexner's advice, proceed to evolve some other methods of reform consonant with our British ideals which will allow us to retain and perfect for the purposes of medical education all the existing medical schools of London with their unrivalled clinical material.—I am, etc.,

November 18th. L. E. S.

THE SCIENTIFIC WORK OF THE ASSOCIATION.

Sir,—The leading article and the report in the Supplement of the Journal for November 15th of the action that the Council is taking to stimulate and revive the scientific work of the Association are most satisfactory. The scheme outlined appears at first sight to be good. Of the necessity for some such undertaking there can be little doubt. First, in the interests of existing members who of late have been sickened of medical politics; it is necessary also to prevent defection from the Association and to attract new members, and to enable us to maintain our position as a society for the advancement of medical science. This work should be undertaken with much greater ease now that a separate department has been instituted for dealing with national insurance. If the work is to be effective the initiative must come from the central body, as also must the primary organization; and it will be necessary, too, for this body to persist in its encouragement of the Branches and Divisions in their attempt to develop their scientific work.

Although there must be in any scheme the greatest elasticity to meet all local wants and the special conditions of different places—to meet the different wants of men living in the town and men living in the country—certain general principles will be essential if the work is to be continuous and homogeneous.

Without which there will be much waste of a quantity of valuable material. There must exist among the members of the Association an enormous amount of knowledge and experience, some of it probably unique, and a certain amount of original thought. The use of the greater part of these is lost to the medical community, and it is in every way desirable that they should be collected and digested. At the same time there are certain new ideas and discoveries the knowledge of which it is desirable to disseminate. Collective investigations that have been conducted in the past have been too artificial and too formal, and many of the scientific meetings have been not only too formal, in consequence of which members have been diffident to enter into the discussions, but they have been too omnibus in character. While it has been felt all should be interested in the meeting, it has been forgotten that it is impossible to satisfy all sorts of medical men at one and the same time. The foundation of any scheme to carry out these objects must be the small informal meeting; if in addition it were of a social character, as it probably would be, so much the better. The matter for inquiry having been decided upon, it would be discussed in the first instance by quite small groups of medical men; they might meet together in one another's houses, whether in the country or in the town. They might afterwards discuss the same subject at a larger or Divisional meeting. At either of these meetings it would be a great advantage to have the assistance of a consultant specialist or lecturer from some neighbouring town or school either to take part informally in the discussion or to initiate it by a clinical lecture or demonstration. The next step would be discussion at a Branch meeting. General practitioners and consultants would all take part in this. And, lastly, a special debate could be arranged at the annual meeting of the Association and a special number of the JOURNAL devoted to the subject.

Conversely, the process of dissemination might commence by a debate at the annual meeting, discussion in the Branches, and finally in the small groups first mentioned. In this way new ideas of pathology and treatment, for instance, might be made known to, investigated by, and tested by, medical men in practice. This process of distribution might well be followed by the reverse process of collection in regard to the same subject. But whatever scheme is adopted it will be absolutely necessary for the Council to give a very strong and active lead. The response of the Branches may at first be indifferent, but it is to be hoped this will not discourage a continued effort in the same direction. The example of Newcastle and Edinburgh ought to encourage the Council in their endeavour; it will be necessary, too, to enlist the invaluable help of our JOURNAL, and it is worth considering whether in addition to the Science Committees of the Branches it would not be well to institute science centres in various parts of the country, for instance where there are universities or medical schools. By some such scheme as the Science Committee of the Council has outlined we should be enabled to co-operate with those existing medical societies which have hitherto held aloof from us, partly probably because of our political activities. As the work succeeds it will not only assist individual members in the practice of their profession, but it will strengthen our Association and enable it to hold indisputable position as a recognized authority in questions of medical science as well as of medical politics.—I am etc.,

Bradford-on-Avon, Nov. 17th. C. E. S. FLEMMING.

PROPOSED INCREASED SUBSCRIPTION.

SIR,—I have just attended a meeting of my Division at which the increased subscription was discussed. As a private member, may I be allowed to say that many of us did not know what we were voting for? It is clear to me now why this was so. Two distinct matters are really involved in what seems a simple question demanding a simple answer, and if these could be kept separate I think the air would be cleared.

1. If it could be shown us that an increase is necessary for the maintenance of the Association as it is, I am sure an overwhelming majority would be secured for this. We do not want to see the Association go under.

2. Unfortunately—and I regard this as a blunder—the proposed increase has tacked on to it a new programme, organizing secretaries, sub-officer, etc. Now many of us are not convinced of the necessity of this, even after carefully reading our SUPPLEMENTS, and if we oppose the increase it may be because we object to paying for a policy that we consider wasteful.

What I now ask for is a succinct financial statement—budget in fact—indicating what increase is necessary for the effective carrying on of the Association as at present organized and staffed. Then, and then only, shall we see clearly how much of the £2 2s. is required to put into effect the new proposals.—I am, etc.,

Nottingham, Nov. 18th. A. CHRISTIE REID, M.D.

THE CRAZE FOR APPENDICECTOMY.

SIR,—Herbert Spencer tells us that there is "an element of error in the greatest truth, and an element of truth in the greatest error," so doubtless there is an element of truth in what Dr. Robert Hutchison has said about the "craze for appendicectomy," for there can be no doubt that there are unfortunately some, but not many, who have had the appendix removed and have yet continued to suffer.

From what I have seen and heard I have come to the conclusion that in many of these a due amount of care has not been given to the preliminary diagnosis. It is safe to assume that there is no immediate danger to life in those doubtful cases which Dr. Hutchison has in mind, and there is no reason whatever for a hasty operation. Every doubtful case should, in my opinion, be placed under observation for at least a week, and kept in bed so that an accurate record of the temperature and pulse can be obtained. Not long ago a man who had never had an attack of appendicitis, but who had continuous pain and discomfort in the right iliac fossa, with tenderness there, entered a nursing home with a temperature close upon 100° F. and an accelerated pulse. Then a dose of castor oil often affords the most important information. For instance, a quantity of scybala may be got rid of, and the pain, discomfort, and tenderness depart; or the evacuations may contain much mucus, or mucus and membranes. These forms of colitis are not difficult to recognize.

But there is another kind of colic or colitis associated with the presence of intestinal sand which may be easily overlooked unless the patient be placed under observation and the sand searched for in the evacuation. A mother who was thought to have appendicitis had much mucus; her daughter who was thought to have appendicitis has much intestinal sand. Both are well after the lapse of several years.

But it is not always improper—as Dr. Hutchison implies—to perform appendicectomy when colitis is present. Sometimes appendicitis causes a colitis which is cured by appendicectomy. Then there are those cases in which colitis spreads to the appendix. In my experience this appendicitis is not in the least dangerous, but may be a source of additional pain and discomfort. In a case of this kind, under the care of my colleague Sir Lauder Brunton, I removed the appendix, with amelioration of the symptoms. But, obviously, such an operation should only be done under exceptional circumstances, after much consideration, and after consultations between physician and surgeon.

Then there is another very difficult type of case in which there is need for great circumspection—namely, those in which a too movable kidney is associated with other symptoms pointing to appendicitis. These symptoms often depart during the period of probation, and after aperients.

I do not know whether it is sufficiently recognized that the gouty may have pain and discomfort in the region of the caecum, and which are put right by treatment, but not by an unnecessary operation.

The stomach symptoms in chronic appendicitis may overshadow those which point to the appendix, and the patient may be in more danger of a needless gastro-enterostomy than of a necessary appendicectomy. But such cases as these should certainly go through the hands of the physician, so that the presence or absence of one or other of the numerous diseases of the stomach may be ascertained. Occasionally appendicitis may be associated with an ulcer of the stomach or of the duodenum. In a case of appendicitis in which there were very strong reasons for

thinking that a gastric ulcer was also present, the removal of the chronically inflamed appendix was followed by a cure. But in another case of appendicitis, in which a duodenal ulcer was suspected, and, I believe, afterwards found, the removal of the appendix had not, after about three months, led to such a happy result. Here the removal of the appendix as a preliminary proceeding was concurred in by my colleague Dr. Horder.

In conclusion, I cannot help thinking that the failures to which Dr. Hutchison refers are often attributable to insufficient clinical observation during a period of probation. But it is difficult to believe that these failures are so numerous as to justify the use of such a censorious question—begging epithet—as that which heads Dr. Hutchison's letter.—I am, etc,

London, W., Nov. 18th. C. B. Lockwood.

Sir,—Surgeons who take more than a passing interest in their cases will welcome Dr. Hutchison's letter on the wisdom or otherwise of removing the appendix to relieve distant or reflex symptoms, as the public, and indeed a large section of the profession, are inclined to agree with him in this, and it is high time that they should be shown the gratifying success attending such treatment. Nobody but a surgeon who is constantly doing abdominal surgery, and who keeps in closest touch with his cases during convalescence and sees them from time to time afterwards, can possibly appreciate the condition causing the trouble and the measures necessary for their relief. It is not the irritation of a diseased appendix alone which is answerable for the symptoms, although one speaks of "chronic appendicitis" and advises its removal. The associated adhesions, "Jackson's membrane," malformation of the appendix and its mesentery, displacement into fossae behind the bowel and consequent pressure upon the nerve supply, and later on the blood supply, all combine to produce the train of symptoms calling for operation, and any one of them alone is sufficient to cause a great deal of discomfort, indigestion, and ill health.

Dr. Hutchison speaks of some patients' condition as being aggravated by removing the appendix. This is, in my opinion, due to the fashionable craze for operating through such a ridiculously small incision that it is impossible to investigate the above-mentioned conditions, which are found more often than not associated with chronic appendicitis. Two of my cases within the last year were apparently no better after operation, and in each extensive adhesions were subsequently divided which had been missed through operating through a 1½ in. incision.

Both are completely cured. So far from surgeons needlessly removing the appendix, the pity is that the train of symptoms caused by its disease, and the other pathological conditions accompanying (or causing) it, are not more recognized. Early surgical treatment would save many a one from chronic dyspepsia, hypochondriasis, neurasthenia, obstinate constipation, intestinal toxaemic attacks, and many other troubles which baffle the physician and make the patient's life a misery to-day.—I am, etc.,

H. Stedman, F.R.C.S.,

November 18th. Surgeon to the Hendon Cottage Hospital.

THE METHOD OF DEALING WITH SCARS BY MULTIPLE INCISION.

Sir,—I was much interested in the article by Mr. Tubby in the Journal of November 1st. When acting as House-Surgeon to the Westminster Hospital I saw Mr. Tubby perform the operation he describes, and since then I have on several occasions performed it, and always with beneficial results.

In my cases, however, I have substituted chlorine ionization for the fibrolysin used by him. It is, I think, now admitted that chlorine does to a large extent remove scar tissue, and the multiple incisions appear to materially diminish the number of applications required by allowing a freer penetration of the ions.

The chief difficulties that have arisen have been in connexion with thin scars fixing the capsule of the interphalangeal joints to the fingers, as here the capsule of the joint is easily penetrated or torn. This difficulty has in a great measure been overcome by using a small, flat-bladed needle in place of the knife, greatly increasing the number of the incisions, and making these in a direction slanting away from the joint.

In conclusion, I would emphasize the importance of keeping the wounds free from suppuration, for which purpose I have found frequently changed compresses of the iodine solution to be efficient.—I am, etc.,

Lincoln, Nov. 4th. Arthur L. Yates.

EXPERIMENTAL OBSERVATIONS ON THE CAUSE OF DEATH IN ACUTE INTESTINAL OBSTRUCTION.

Sir,—Mr. Howell, writing in your issue of November 15th, brings forward certain criticisms of the conclusions which I had drawn from the results of my experimental work on acute intestinal obstruction, as described in the Journal of October 25th. I am very conscious of the care which must be exercised in applying the conclusions drawn from animal experiments to conditions met with clinically in the human subject; but I am convinced that the only hope of attaining to the truth on such intricate questions lies in recording the results of accurate scientific investigations, and not the impressions conveyed by uncontrolled clinical observations. The permeation of the healthy intestinal wall by bacteria has never, so far as I am aware, been shown to occur. I have repeatedly fed animals with bacteria, and some hours later opened their abdomens and made films and cultures from the surface of the intestines and the omentum, but have never seen the slightest evidence of the migration of organisms through the intestinal wall.

I am surprised to find that any one should question what is an established fact—namely, that the upper reaches of the small intestine are comparatively sterile. Apart from cases of gastric carcinoma, in which the stomach always contains bacteria, the danger of peritoneal infection from the gastro-intestinal lumen in the operation of gastro-enterostomy is exceedingly slight, and cultures made from both stomach and jejunum as a rule remain sterile. I cannot recall any case of death from peritonitis after a gastro-enterostomy for a benign gastric or duodenal lesion. How different the corresponding risk is in operations on the lower bowel most surgeons have learnt from sad experience.

Mr. Howell asks what I mean by "peritonitis" in conclusion (5) of my paper. I mean the reaction of the peritoneum to infection by bacteria.—I am, etc.,

Edinburgh, Nov. 18th. D. P. D. Wilkie.

THE IDEAL TUBERCULIN.

Sir,—I sincerely congratulate Dr. Halliday Sutherland. Less than three years ago he had not a good word to say for the tuberculins prepared in accordance with Koch's instructions, and was the champion of Beraneck's tuberculin. Since 1911 he appears to have been using a curious mixture of all Koch's tuberculins on a theory of his own, and to-day Beraneck's preparation finds no place in his prescription. Thus, a few months after using somewhat violent language against me because I used Koch's preparations, he has been somehow induced to alter his views. It is too early yet to condemn his new and curious system.

His method suggests an old-fashioned prescription loaded with every conceivable drug, in the hope that one of them might do good. The scientific basis of his multiple charge of tuberculins of every form, which excludes, nevertheless, the one which he praised so much but a short time ago, is not new. I have worked upon this idea for at least fifteen years. The chief difference between us is that I have used these different varieties in succession instead of in combination, and I hold with others, such as Jochmann, that this is a more accurate and a more effective way of attaining the desired result than Dr. Halliday Sutherland's purely arbitrary way. It will take many years for Dr. Halliday Sutherland to arrive at any conclusion, and I doubt if even a greater than Dr. Halliday Sutherland could determine by his method which is the effective agent in his multiple charge.

He seems to imply that hitherto our knowledge has not been gained "by careful observation and by clinical experiment," but not only I myself, but scores of observers, such as Turban, Petruschsky, Trudeau, Bandelier, Moeller, etc., have surely gained our knowledge "by careful observation and by clinical experiment," begun long before Dr. Halliday Sutherland was old enough to become a medical student.

Dr. Halliday Sutherland is learning, and thereby approximating more and more to the methods of those who have a claim to speak with authority upon the methods of using tuberculin.—I am, etc.,

W. CAMAC WILKINSON, M.D.Lond., F.R.C.P.

London, W., Nov. 17th.

LONDON MEDICO-PSYCHOLOGICAL CLINIC.

SIR,—In the article you publish on the inaugural meeting of this clinic, you give a short abstract of what I said at this meeting. My speech has of necessity been much condensed, but the writer in so doing has no doubt endeavoured to put the gist of what I said in his own words, and in this way has misquoted me. *Inter alia*, I am alleged to have stated that, "with the exception of a clinic in Liverpool, there was no hospital in England where a patient suffering from incipient mental disorder could be taken and treated in the proper way."

What I did say, Sir, was that there was no general hospital in the country where there were beds in which patients suffering from incipient mental disorder could be treated, and that it was left to private charity to lead the way. I never mentioned anything about the Liverpool clinic, as I have not the pleasure of knowing its work, though I note that this clinic is referred to in the prospectus of the London Medico-Psychological Clinic.

Further, if I had mentioned any institution by name, I should have certainly referred to the Lady Chichester Hospital at Brighton, which is under the medical directorship of Dr. Helen Boyle. This hospital, in which every variety of known treatment is used, has been doing excellent work for over eight years, and has stood alone in its attempt to give a lead to the early treatment of mental disorder in hospital wards.

The London Medico-Psychological Clinic is, at the moment, only attempting to deal with purely psychological treatment, and although one welcomes every effort made to advance medicine along legitimate lines, the value and limits of this treatment have still to be proved.—I am, etc.,

London, W., Nov. 18th. MAURICE CRAIG.

SIR,—As one who was present at the inaugural meeting of the Medico-Psychological Clinic recently held at University College, I should like to express satisfaction with the letter the committee addressed to you last week. It was particularly unfortunate that a gentleman holding Lord Sandwich's views should have been chosen to occupy the chair on that occasion, and thereby given the opportunity to expound at considerable length and detail his bizarre claims as a "healer" to an audience composed in part of qualified medical men and women who were present by invitation. I could not help noticing that at least one well known medical man promptly got up and fled. Most of the newspapers reported the proceedings, and devoted their report almost exclusively to the mystic pronouncements of Lord Sandwich, so that the general public have no doubt got a quite erroneous impression of the views and methods of the proposed clinic. Such being the case, surely it would have been wise for the committee to have communicated the gist of their letter to you, Sir, to the lay press as well.—I am, etc.,

London, W., Nov. 17th. STANLEY NOBLE, M.D.Brux.

SIR,—Our names having appeared as supporters in the circular convening the inaugural meeting of the Psycho-Therapeutic Clinic, mentioned in your last issue, may we be allowed to say that we can no longer continue to support the scheme in its present form?—We are, etc.,

HUGH WINGFIELD.
MAURICE B. WRIGHT.

London, W., Nov. 18th.

*** Dr. Edwin L. Ash, of the London Nerve Clinic and School of Psychotherapy, desires that it should be recognized that that clinic has no connexion with any other organization, institute, or clinic.

PSYCHO-ANALYSIS.

SIR,—May I be permitted to correct a slight error which occurred in my paper on "A Case of Extensive Amnesia," etc., in your issue of November 8th? In the second column of p. 1218 there appears the following sentence: "Psycho-analysis, in the form of word-association tests, was tried for three *days*." Here "days" should be "*weeks*." A comparison of the dates given in the paper will bear this out. As every psycho-analyst knows, treatment for so short a time as three days would be absurd. It may not be out of place for me to add that, in addition to Jung's word-association tests, the ordinary Freudian method of psycho-analysis was employed, especially in connexion with the patient's dreams.—I am, etc.,

WILLIAM BROWN, M.A., D.Sc.,
Psychological Laboratory,
November 15th. University of London, King's College.

Medico-Legal.

OPERATIONS AND THE CHILDREN ACT.

IN the King's Bench Division, on November 14th, three judges considered a case in which certain magistrates had refused to convict a person summoned as an offender against the Children Act of 1908. The alleged offence, as recorded in the *Times*, was one of wilful neglect of a girl, aged 13, who was suffering from mental dullness, impaired breathing, deafness, and anaemia; these conditions were due to the existence of adenoids, and consequently the parents were urged to allow the latter to be removed by an operation which was not dangerous, but would probably necessitate the use of an anaesthetic. The parents refused to have the operation performed, on the ground that they did not consider an operation necessary, and did not believe in operation. It was denied that the refusal to have the operation performed constituted neglect under the Act. The magistrates decided that the parents were under no legal liability to allow such an operation to be performed, and that their refusal to agree to it did not constitute neglect to provide adequate medical aid within the meaning of the Act.

In delivering judgement, Mr. Justice Darling said that among the facts admitted in the case were that the child was suffering from adenoids causing deafness—which was one of the ailments specially provided for in the Act—and that the defendant had refused to permit an operation for their removal. This clearly showed that he had had the need of an operation brought to his notice. The Act obviously contemplated the performance of operations, and the fact that in the present case the parents did not believe in operations showed that they were people whose opinions were of little weight. It was common knowledge that the adenoid operation was commonly performed, and if it was not performed in a case where it was necessary, circumstances might arise in which the child's life might be endangered. On the admitted facts the magistrates, it seemed to him, might properly have convicted, so the case must go back for rehearing. In such cases it was no answer in law that the child's parents or other guardians did not think an operation necessary, or did not believe in operations at all, though refusal to allow an operation was not necessarily such a refusal to provide medical aid as to amount to wilful neglect within the meaning of the Act. In deciding whether there had been wilful neglect in any given case, the magistrates must consider what was the nature of the operation suggested and the reasonableness of the refusal to have it performed.

Mr. Justice Avory and Mr. Justice Atkin concurred, the former adding that a further point to be considered by magistrates was the position of the individual who required the operation to be performed. Was the operation ordered by a qualified medical man or was it merely the suggestion of some irresponsible person?

The Services.

CLUBS AS HOSPITALS IN WAR.

COLONEL VALENTINE MATHEWS, late R.A.M.C.Vols. (London, S.W.), writes: I was glad to see an announcement in the *Times* a few days ago that the Automobile Club was selected for one of the general hospitals to be provided for the Territorial Force in the London district in case of invasion.

For several years past I have been advocating the registration of all of the clubs on the south side of Pall Mall for hospital purposes in case of mobilization of the Territorial Force.

The buildings themselves provide large rooms suitable for wards, sufficient rooms to house a hospital staff, good cooking arrangements in working order, and good sanitary fittings and water supply, while the gardens at the back would afford additional space for offices of various kinds under canvas or light temporary buildings.

I have also advocated that arrangements should be made with the large hotels in the neighbourhood, under which they would provide bedsteads of suitable size with bedding and linen and many other articles, such as plates, knives, forks, etc., for use in the buildings selected.

In this way I believe that in a very short time on mobilization all these selected buildings would be available for reception of patients, although, of course, arrangements for the supply of purely medical equipment would, in any case, have to come through some other source. This scheme would provide suitable hospital accommodation at short notice, while the members of the various clubs would experience no more inconvenience than when their clubs are closed for the usual cleaning, which in time of war is, I think, saying a good deal.

Obituary.

MAJOR HERBERT CUMMING FRENCH, R.A.M.C.

The death of Major Herbert Cumming French, which occurred on October 13th, will be severely felt by the medical profession generally, and especially by the Royal Army Medical Corps.

The third son of Major-General Sir George French, K.C.M.G., the deceased officer was born at Quebec, Canada, in 1869. He was educated at Christ Hospital School, Brisbane Grammar School, and King's College. At King's College Hospital his career as a student was full of promise; in 1891 he was resident Warneford scholar, and in the following year he held a senior scholarship.

Major Herbert Cumming French.

He entered the Royal Army Medical Corps in July, 1893, and served at various stations in England as well as in India, Aden, South Africa, Egypt, Cyprus, and Malta. During 1901 and 1902 he served in the South African war, including the operations in the Orange River Colony, and was awarded the Queen's medal with two clasps.

On November 17th, 1902, when on the transport *Wakool* in the Straits of Malacca, he jumped overboard from the upper deck at night, into a sea swarming with sharks, to save the life of a native fireman. For this act he was awarded the silver medal of the Royal Humane Society, and also the Royal Albert medal, which was personally presented to him by His Majesty King Edward VII.

Throughout his service Major French directed his energies more particularly to dermatology and venereal disease, and held specialist appointments in these subjects from 1904 to 1909 at Cairo, Woolwich, and Malta. In 1911 Major French delivered the Hunterian lectures at the Royal College of Surgeons, England, on Recent Development in the Recognition, Treatment, and Prophylaxis of Syphilis. In 1912 he read a paper before the Royal Society of Medicine on Syphilis; and in 1913 another at the Seventeenth International Congress of Medicine, on Syphilis: its Dangers to the Community and the Question of State Control.

In September, 1913, Major French was elected a member of Council of the Section of Dermatology, Royal Society of Medicine, for the years 1913–1914, and so recently as last month he was invited to contribute a paper at a meeting of the Harveian Society.

For some years past Major French's work had been carried out in spite of a severe and painful illness which he bore with the greatest fortitude. Those of his brother officers—and they were many—who had the privilege of his friendship will mourn sincerely the death of one who was popular wherever he served, and who as a keen professional man, a friend, and a gentleman had few equals. The following letter to his father, written by the Director-General, Army Medical Service, on October 24th last, expresses Major French's value as an officer:

> I write a line to convey my deep sympathy with you on the death of your distinguished son, the late Major Herbert French, who was not only an ornament to his own corps but to the army also. Had he lived he was sure to have attained a high position. Both from his force of character and intellectual attainments he is altogether a very great loss. I would have written sooner but have been so much on the move, so pray accept my humble if somewhat late tribute.—Believe me, faithfully yours, W. L. Gubbins, Director-General.

Major French married in January, 1905, Helen, daughter of Mr. Joseph Healy, barrister, of Boston, U.S.A., and leaves a son aged 4½ years.

ALFRED GODSON, J.P., M.A., M.B., M.C.Camb.,

LATE MEMBER OF COUNCIL OF THE BRITISH MEDICAL ASSOCIATION AND MEDICAL OFFICER OF HEALTH FOR CHEADLE.

The announcement of the death of Dr. Alfred Godson, of Cheadle, near Manchester, on October 26th, will be received with regret by his many friends, and by none more than by his former colleagues on the Council of the British Medical Association. Dr. Godson was the second son of the late Rev. John Godson, and was born in London on October 9th, 1836; he was thus in his 78th year when he died. The greater part of his life was spent in the neighbourhood of Manchester, for while he was still young the family removed to Oldham, where his father had been appointed to a cure. He received his early education privately under the tutorship of the late Canon Whitaker. Later he proceeded to Trinity College, Cambridge, where he had gained a sizarship, and graduated there as a senior optime in 1859. Having decided to take up a medical career, he continued after graduating to reside at Cambridge for the study of medicine, and he did much work under Professor G. M. Humphry. In due course he took the degree of M.A., and in 1864 those of M.B. and M.C. Soon after this he went to Manchester, where he became attached to the Manchester Royal Infirmary as physicians' assistant, and for a time was demonstrator of anatomy in the old Pine Street school of medicine. He did not, however, long retain this appointment, for in 1865 he commenced private practice at Cheadle, where he continued to reside until his death. His ability, joined to an attractive manner which inspired confidence in his patients, soon obtained for him a very large practice, from which he only retired about nine years ago.

Even during the busiest period of an extensive practice his methodical habits always allowed him to take an active part in the public life of his district. He held the Poor Law appointment for the Cheadle District of the Stockport Union; for many years he was Medical Officer of Health for Cheadle, and when he retired from that position some few years ago was presented with an illuminated address as a mark of the district council's high appreciation of his services. He was a justice of the peace for the County of Cheshire; he was also the representative of the Cheadle District on the Cheshire County Council, and did much good work as the chairman of the Midwives Committee of that council.

In addition to his public work he always found time to take an active part in the work of the British Medical Association. For many years he was regarded as one of the best workers on behalf of his professional brethren in connexion with the Lancashire and Cheshire Branch of the Association, and his knowledge of professional life and keen interest in defending the rights of the profession, resulted in his being elected a member of the Central Council of the Association. To this position he was re-elected several times. As a member of the Council he was most regular in his attendances, and did a large amount of excellent work on the various committees and sub-committees, and even when he retired, on account of advancing age, from active work he never lost his interest in the medico-political work of the Association; one of the last meetings he attended was in connexion with the Insurance Bill. In the midst of all this public and medico-political work he kept himself fully abreast of the scientific progress of his profession. He was a member of numerous

scientific societies, was president of the Stockport Medical Society, a Fellow of the Cambridge Philosophical Society, and for two years vice-president of the Manchester Medical Society.

He married Frances Mary, the only daughter of the late Mr. Henry Ratcliffe, clerk to the county magistrates for the Oldham Division, and leaves a family of four sons and three daughters. One of these sons, Dr. J. H. Godson, succeeded him in his practice at Cheadle when he retired nine years ago, and in the post of Medical Officer of Health for Cheadle and medical officer for the Cheadle District of the Stockport Union.

RICHARD DEANE ROKER SWEETING, M.A.Oxon., M.D.Dub., M.R.C.S.Eng., L.S.A., D.P.H.Camb., Barrister-at-Law,

SENIOR MEDICAL INSPECTOR OF THE LOCAL GOVERNMENT BOARD.

It is with regret that we record the death, on November 10th, of Dr. R. D. Sweeting, who during his career in the public health service did much valuable work.

He was the son of Richard Sweeting, M.D., of Clapham Park, S.W., and was born at Nassau in the Bahamas. He was at school at Malvern College, and received his medical education at the London Hospital. He obtained the diplomas of M.R.C.S. and L.S.A. in 1879; subsequently he entered as an undergraduate at Oriel College, Oxford, and, proceeding to Dublin, took the degree of M.D. at that university. He became a member of Gray's Inn, and was Holt Scholar in Constitutional Law in 1895. He won the Howard Medal and Prize of the Statistical Society in 1883 with an essay on the sanitation of public institutions.

He was Buxton Scholar at the London Hospital in 1874, and, after holding the appointment of house-physician at this institution, he became in 1880 the medical superintendent of the Western Fever Hospital of the Metropolitan Asylums Board at Fulham. He wrote the medical reports on this hospital for the years 1880–89, and prepared the "Memorandum on Vaccination" for the Metropolitan Asylums Board in 1882. It was at this hospital, and during Dr. Sweeting's period of office, that Sir William (then Mr.) Power carried out an important part of his investigation concerning the occurrence of small-pox in the neighbourhood of small-pox hospitals, which resulted in all the small-pox hospitals of the Metropolitan Asylums Board being removed to some distance outside the metropolis. Dr. Sweeting gave evidence before the Commission on Small-pox and Fever Hospitals of the Metropolis in 1882.

Dr. Sweeting served as a temporary medical inspector of the Local Government Board during the "cholera survey" undertaken by the Board, 1885–86, and was appointed a medical inspector in 1890. He was the author of many reports published by the Local Government Board. His special knowledge of small-pox was of considerable value to the Board, and he dealt with several outbreaks of this disease. He gave evidence before the Royal Commission on Vaccination which was appointed in 1889 and reported in 1896; his evidence in regard to the fatality and severity of type of small-pox amongst vaccinated persons, with marks of different quality, was a classical contribution to this subject. In late years he was the inspector entrusted with the duty of visiting the educational vaccination stations of the kingdom, where the teachers and examiners are authorized to grant the special certificates of proficiency in vaccination.

He acted as examiner in public health to the Conjoint Board in England and at the Cambridge and Oxford Universities.

For twenty years he was honorary treasurer of the Epidemiological Society of London, and was vice-president of the Epidemiological Section of the Royal Society of Medicine.

He married in 1883 the daughter of the late William Rothery of Harrogate, and leaves a widow and two daughters.

ROBERT LEAMON BOWLES, M.D., F.R.C.P.

The announcement of the death, on November 15th, of Dr. R. L. Bowles, formerly of Folkestone, at the age of 79, has been received with great regret by a large circle of friends.

Robert Leamon Bowles received his medical education at St. George's Hospital, and took the diplomas of M.R.C.S.Eng. and L.S.A.Lond. in 1856. He became a Licentiate of the Royal College of Physicians in 1864, a Member in 1875, and a Fellow in 1882, in which year he also took the M.D. degree of the University of St. Andrews. He was for the greater part of his life engaged in practice in Folkestone, where he long held a leading position; he was physician to the hospital there, and on his retirement was appointed consulting physician; he was also physician to the St. Andrew's Convalescent Home, Folkestone. When he left that town he took a house in Upper Brook Street, London, W., where he continued to practise for some years, the success which he had achieved in Folkestone following him to the metropolis. Dr. Bowles was not only a busy and successful practitioner, but was also greatly interested in two subjects which lie on the borderland of medicine and physiology. All through his life he gave much study to the disorders of the respiratory function, and pointed out in particular the influence of posture on stertorous respiration, especially in cases of apoplexy. He contributed an article on stertor to the first edition of *Quain's Dictionary of Medicine*, and also made many observations and wrote much on artificial respiration. His views on this subject were brought together in a work on *A Method for the Treatment of the Apparently Drowned*, published in 1903. The other subject with which his name is particularly associated is the effect of sunlight on the skin. He was led to take an interest in this matter owing to observations made during his periodical visits to Switzerland. He observed that the châlets were burnt a deep mahogany-brown in parts not covered by snow in winter, and was led on from this observation to the conclusion that sunburn, which is often so distressing an interruption of mountaineering, was due not to the direct sunlight, but to that reflected from the snow. He contributed a paper on sunburn to the *Alpine Journal* in 1888, and subsequently wrote many articles and notes on the subject in this Journal.

Some years ago he retired from practice and went to reside at a small estate he had acquired at Priors Mesne, near Lydney, Gloucestershire, where he occupied himself largely in gardening.

For several years Dr. Bowles had not been much seen in London, but for long he was a familiar figure in medical society and at medical societies, and his enthusiasm and geniality made him many friends and admirers. During his residence at Folkestone he served the office of president of the South-Eastern Branch of the British Medical Association and was always an active member and cordial friend of the Association. He was a member of the Parliamentary Bills Committee from 1898 to 1901, and was a Vice-President of the Section of Medicine at the annual meeting of the Association in Glasgow in 1888.

DONALD TOLMIE MASSON, M.A., M.D.St.Andrews.

Although a doctor of medicine, Donald Tolmie Masson, who died at his house in Edinburgh on November 9th, had spent his years in ministerial and not in medical practice. He was born in the Black Isle of Ross, and was the eldest son of a farmer there. He acted as schoolmaster of the parish of Knockbain, and, leaving his scholars in the charge of a locumtenent in the winter months, studied in Aberdeen, and graduated M.A. in the university in 1851. He was ordained to the parish of Stoer in 1852, and a year later was called to the Gaelic Church in Broughton Street, Edinburgh, of which he was the pastor till 1896, when he retired. His duties as minister of this small congregation did not occupy his whole time, and he took out medical classes at the Royal College of Surgeons in Edinburgh, and took the degree of M.D.St.Andrews in 1862; he did this with the purpose of helping his fellow-parishioners if he were called to any distant Highland glen where medical aid could be got only after many hours' delay or not at all. He was sent on a mission to the Gaelic-speaking folk of the Church of Scotland in Canada and Newfoundland, and received many calls to churches in the Dominion; but his attachment to his native land and the love of his wife (granddaughter of the chief of the Clan Matheson) for Edinburgh kept him all his life in that city. He was a true Highlander and a

keen Celtic scholar, as his (unfinished) work, *Vestigia Celtica*, proves. Other books were: *The Gael in the Far West*, *Our Gaelic Paraphrases*, and *Celtic Folk Medicine*. He also contributed a remarkable article on eugenics to the *Caledonian Medical Journal* in 1897–8; it was entitled, "Breeding our Manhood from the Shots: A Remonstrance and Appeal addressed to the Medical Profession," and it undoubtedly helped to pave the way for the eugenists of to-day. Dr. Masson's death was due to heart failure. He was buried in the New Calton Cemetery on November 12th.

ANTONIN PONCET, M.D.,

PROFESSOR OF CLINICAL SURGERY, UNIVERSITY OF LYONS.

Professor Antonin Poncet, who died suddenly in September, at the age of 67, was the son of a notary. He lost his father when very young, and was brought up by his grandfather, a country doctor. He was born at Saint-Trivier-sur-Moignains, in the department of Ain, in 1846. He received his literary education at the Petit Séminaire of Belley, and it was doubtless his early religious associations that caused him to retain throughout life a profound respect for religious things. He never in after-life met a sister of charity in the hospital corridors without stopping to speak to her. He studied medicine first at Lyons, where he was interne under Ollier, and afterwards in Paris, taking his doctor's degree with a thesis on the various forms of jaundice in 1879. Soon afterwards he became *professeur agrégé* of surgery. In 1882 he was appointed professor of operative surgery at Lyons, and he became professor of clinical surgery in 1890. In the meantime he had been to England to see Lister's work, and had travelled in Austria, Germany, and the United States.

Poncet was for years the leading surgeon of the south-east of France. His power of work at that time was very great. Every morning he was at his hospital at 8 o'clock, left it at 1, reappearing at 2, and operating for the rest of the day. He had what one of his colleagues, Professor Pollosson, in his funeral oration happily called an "extraordinary tonicity." He formed quite a number of surgeons all marked with his stamp, that is to say, largeness of view from the physiological standpoint, and boldness in operating. When on June 24th, 1891, President Carnot was stabbed by the anarchist Caserio, Poncet was first called, and, standing on the step of the President's carriage, he tried to stop the bleeding with his hand. The liver was transfixed, and Poncet, after a hurried consultation with Ollier, Lépine, and others, performed laparotomy as a desperate resource. Poncet published many works on diseases of the bones, prostate, and other parts. To him medical science owes the first clear account of human actinomycosis. When at the height of his fame in 1896, he gave up the practice of surgery for research. His idea was that inflammatory tuberculosis underlay conditions known as rheumatism, scoliosis, genu valgum, retraction of the palmar aponeurosis, and all sorts of scleroses affecting the heart, the kidney, the liver, and other organs. His doctrine was keenly criticized, but at the Société de Chirurgie, the Société Médicale des Hôpitaux, and the Académie de Médecine, to which he presented the fruits of his labours, he stoutly held his ground.

In his later years Poncet took a great interest in medical history, and his monographs on Calvin, Jean Jacques Rousseau, and the revolutionary Couthon, are models of the kind. He was a diligent attendant at the meetings of the Medico-Historical Society, and was president of the Association of Medical Journalists. He was a man of great charm of manner and amiability without weakness. His character has been admirably sketched in the *Gazette des Hôpitaux* by a pen no less eminent than that of Paul Bourget, who knew him intimately in later life. The author of *Un Divorce* sums up his life as follows:

"Beginning by humble professional work, acquiring excellence therein, and when the years of apprenticeship are over using those of mastership to collect and co-ordinate his fragmentary experiences in order to arrive at generalizations which guided science into new paths—there could be no finer curve of destiny for a man of thought. Of this Poncet was a perfect model. He himself used to cite with pleasure what the anatomist Farabeuf said to him one day, 'You are not only a chirurgeon, you are a *cephalurgeon*.'" His views and hopes are found expressed in the treatise on inflammatory tuberculosis which he published last year in collaboration with his pupil, M. René Leriche. Professor Poncet was an officer of the Legion of Honour, and had been president of the French Congress of Surgery.

There passed away in October the oldest medical practitioner in the province of Ulster—Dr. William Watts Thetford, of Strangford, a man of singular gifts and wide experience. He was born at Clones in county Monaghan, and was from his boyhood attracted to medicine. His grandfather, Dr. Nicholas Thetford, and seven of his uncles had all been medical men. As a student of Trinity College, Dublin, and at the Richmond Hospital, where he subsequently held an appointment, he had a very distinguished career. In 1849 he received the diploma of Membership of the Royal College of Surgeons of England, and in the following year became a Licentiate of the Royal College of Physicians in Ireland. At the time of his death he had been resident in Strangford for upwards of half a century. He originally went there as medical officer of the dispensary, but subsequently resigned this appointment owing to the strain of the large private practice he built up. Devoted at all times to his work, he had an unusually successful record, and counted amongst his best friends Jonathan Hutchinson, Spencer Wells, Jenner, and Paget, with all of whom he was associated in many remarkable cases. He was a man of wide sympathy, especially for the poor, and none ever sought his help in vain. He died on October 19th, in the 91st year of his age.

We regret to announce the death of Dr. Charles McBurney, the distinguished American surgeon, which occurred at Brookline, Massachusetts, in the 69th year of his age. He was professor of clinical surgery at Colombia from 1892 to 1907. He was called to Buffalo to attend President McKinley when he was shot. He was a member of numerous medical societies in America and Europe, and his name was familiar to every student of medicine throughout the world in connexion with appendicitis, in the diagnosis of which "McBurney's point" plays a definite part. We hope to publish a fuller obituary in a later issue.

Dr. Léon Bourget, professor of clinical medicine at Lausanne, who died recently, was born in 1856. He took his doctor's degree at Geneva in 1884, and after teaching as *privatdozent* for some time at Geneva he settled in practice at Lausanne. Some years later he was invited to occupy the chair of pharmacognosis and therapeutics in the medical faculty of that city. Later, the State Council appointed him professor of clinical medicine. He was the author of a manual of clinical chemistry, a treatise on therapeutics (written in collaboration with Professor Rabow), and a monograph on diseases of the stomach. He wrote also on dietetic systems, on gastro-enterostomy (in collaboration with Professor Roux), on the hygiene of the stomach and intestine, and on the errors and fallacies of modern medical science.

Professor Edwin Klebs, the well-known pathologist, recently died at Bern, in the 80th year of his age. He was born at Königsberg, in Prussia, in 1834, and after graduation worked in the physiological laboratory for a short time. He then devoted himself entirely to pathology, becoming assistant to Rudolf Virchow in 1861. In 1866 he was invited to occupy the chair of pathology at Bern. In 1871 he migrated in the same capacity to Würzburg; two years later he accepted an invitation to Prague, and in 1882 he moved to Zurich. There he taught till 1892, when he returned to Germany. He lived at Karlsruhe till 1895, when he went to Asheville, in North Carolina, as director of a sanatorium, to which a laboratory for the manufacture of bacterial therapeutic products was attached. In 1896 he became professor of pathology in the Rush Medical College, Chicago. A few years ago he returned to Europe, and spent the last years of his life at Hanover, Berlin, Lausanne, Dortmund, and Bern. In his younger days Professor Klebs published a number of monographs and memoirs on various subjects connected with pathology. He was also the author of a *Handbuch der pathologischen Anatomie* (1868 to 1880). The last two decades of his life

were devoted to the preparation of bacterial products for the treatment of tuberculosis, of which "tuberculocidin" and "antiphthisin" may be mentioned.

SURGEON-MAJOR RUSTOMJEE BYRAMJEE, Bombay Medical Service, retired, died at Ravenscourt Park, West London, on November 3rd. He was born on October 24th, 1833, took the diplomas of M.R.C.S. and L.S.A., and the degree of M.D. at St. Andrews in 1856, and entered the I.M.S. as assistant surgeon on January 29th, 1857. He became surgeon on January 29th, 1869, and surgeon-major on July 1st, 1873, and retired soon after he had earned the first pension (October, 1875). He served in Arabia in 1858, at the capture of the fort of Sheikh Othman, near Aden. Dr. Byramjee was the second Indian to gain a commission in the Indian Medical Service, and the first posted to Bombay. Under the East India Company's rule, only three Indians were admitted to the service. The first was S. C. G. Chuckerbutty, who passed first at the earliest competitive examination held, in January 1855. The third was R. C. Chandra, who entered on January 27th, 1858. Both Chuckerbutty and Chandra were posted to Bengal, where both in succession held the posts of professor of materia medica in the Calcutta Medical College and second physician to the College Hospital. Chuckerbutty died in 1874, Chandra in 1895, so Byramjee had long survived his contemporaries.

Universities and Colleges.

UNIVERSITY OF LONDON.

THE DEPARTMENTAL COMMITTEE.

THE President of the Board of Education, on November 12th, addressed to the Vice-Chancellor of the University of London a letter defining the position of the Government in regard to the proposed reconstitution of the university.

He states that the Government has decided that the scheme of the report of the Royal Commission on University Education in London is calculated to produce a University of London worthy of the name. The Departmental Committee recently appointed will not go over the ground again; its business will be to discover how far the numerous bodies and persons concerned are prepared to co-operate on the basis of the principles underlying the scheme which Mr. Pease then proceeds to classify under the following heads:

(1) That the government of the university, and particularly its financial administration, shall be entrusted to a small Senate predominantly lay in its composition and not representative of special interests; and

(2) That on the other hand the control of the teaching and the examinations of students in colleges of the university shall be in the hands of the teachers.

(3) That the educational and financial control of the constituent colleges shall be vested in the university; and

(4) That as much of the university work as possible, together with the university administration, should be concentrated in a central university quarter. (The question of the particular site to be selected is one on which the Departmental Committee will be able to advise the Government after they have considered the various alternatives that have been proposed.)

(5) The scheme of reconstruction should provide effectively for continuance of access to university examinations by external students—that is, by those who are not attached to any college or school of the university.

After enumerating these principles he goes on to say that it has never been proposed that the Imperial College of Science and Technology should be moved from its present site, though it is an essential part of the scheme that it should become a constituent college of the new university under the educational and financial control of the Senate. The word "incorporation" sometimes used as a convenient term to describe the position of a constituent college does not imply any such vesting of its property in the university as would preclude the earmarking of capital or income by donors and benefactors for particular institutions or specific purposes, and this applies to past no less than to future gifts.

The Government intends, when the necessary negotiations have been concluded, to introduce legislation to give effect to these principles, and Mr. Pease hopes that sufficient agreement may be attained to secure the acceptance of the bill in Parliament as a non-contentious measure. Further, the Government will be prepared in the event of such legislation to make substantial new contributions to the university, and is confident that the establishment of a university worthy of the capital of the empire will be regarded by the citizens, livery corporations, and corporate bodies of London, equally with the Government, as an object deserving their interest and support. The hope is expressed that in the circumstances those who are interested in the work of reconstruction will not hesitate to make some mutual surrender of views and opinions, since existing differences perhaps owe their origin in a large measure to the uncertainty which has so long prevailed even as to the main lines of reconstruction.

UNIVERSITY OF CAMBRIDGE.

THE following degrees have been conferred:

M.D.—H. L. Duke, P. K. Gilroy.
M.B., B.C.—H. C. Attwood, H. J. Couchman.
B.C.—F. G. Rose.

NATIONAL UNIVERSITY OF IRELAND.

Diploma in Ophthalmology.

AT the meeting of convocation of the National University of Ireland, held in Dublin last week, a motion was proposed by Dr. Edward Magennis requesting the Senate to create a special degree or diploma in ophthalmology. He referred to the fact that the University of Oxford had recently created a diploma in ophthalmology. On a division the resolution was carried by 25 votes to 7.

School Medical Inspectors.

Dr. Magennis also proposed a motion requesting the Senate to institute lectures, to be delivered to qualified medical practitioners, in order to train them to become medical inspectors of schools, and to create a special degree, diploma, or certificate, to be conferred on those who pass a special examination. He pointed out the necessity for medical inspection of school children to remedy and prevent deafness and defective vision, and to detect at an early stage infectious and contagious diseases. Dr. McWalter seconded the resolution, which was passed.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary Council was held on November 13th, when Mr. G. H. Makins, Vice-President, was in the chair.

The late Dr. J. Lucas-Championnière.

The Secretary reported the death, on October 22nd, of Dr. J. Lucas-Championnière, an Honorary Fellow of the College, and stated that the President had written to his widow to express the sympathy and condolence of the Council.

Grant of Diplomas.

Diplomas of membership were granted to 102 candidates found qualified at the recent examinations.

The Bradshaw Lecture.

The Bradshaw Lecture will be delivered by Mr. G. H. Makins on Friday, December 5th, at 5 p.m., on the subject of "Gunshot Wounds."

Vacancy on the Court of Examiners.

The Senior Vice-President reported that Mr. W. G. Spencer's term of office on the Court of Examiners would expire on December 10th, and that the vacancy would be filled up at the ordinary Council on December 11th. Mr. Spencer is eligible for re-election.

Primary Fellowship Examination.

At the Primary Fellowship Examination for the Fellowship of the Royal College of Surgeons of England in Anatomy and Physiology, held on November 5th, 6th, 11th, 12th, 13th, and 14th, for which 129 candidates presented themselves; of these 44 were approved and 85 (or 66 per cent.) were rejected, and the following candidates were approved, namely:

R. G. Bannermann, S. G. Billington, T. J. Cobbe, H. E. C. Collins, R. M. de Mowbray, I. F. Diay, E. H. Eastwood, G. W. Marshall Findlay, A. G. T. Fisher, J. A. C. Forsyth, H. H. M. Gould, H. E. Griffiths, R. M. Handfield-Jones, W. L. Holyoak, H. T. Hunter, L. G. Jacob, M. K. Joshi, T. Julian, O. R. M. Kelly, R. Kennon, W. A. Lincoln, E. A. Lindsay, D. Loughlin, P. G. McEvedy, A. D. Marston, J. C. Metcalfe, E. T. C. Milligan, H. W. L. Molesworth, G. T. Mullally, E. F. Murray, G. E. Neligan, J. M. O'Donovan, R. F. O'Sullivan, J. H. Pendered, G. Perkins, J. H. Rawlinson, W. H. C. Romanis, A. Shafeek, J. C. Storey, A. Sunderland, D. G. C. Tasker, R. A. R. Wallace, J. R. M. Whigman, M. H. Whiting.

CONJOINT BOARD IN ENGLAND.

AT a meeting of the Royal College of Physicians on October 30th, and of the Royal College of Surgeons on November 13th, diplomas of L.R.C.P. and M.R.C.S. were conferred on the following candidates:

C. S. Archer, W. S. Armitage, C. S. Atkin, F. G. Bell, F. V. Bevan Brown, W. G. Bigger, G. A. Bird, J. Bostock, G. J. Bowen, H. J. Bower, E. J. Bradley, E. H. P. Brunton, N. St. J. G. D. Buxton, J. Byrne, E. W. Carrington, F. S. Charnock, F. B. Chenoy, F. Cook, G. M. Coope, E. Coplans, C. H. Crawshaw, W. L. G. Davies, H. V. Deakin, H. S. de Boer, H. R. Dive, A. R. C. Doorly, E. J. Eacrett, A. T. Edwards, H. el Arculli,

A. S. Erulkar, A. R. Esler, W. S. Evans, J. M. Evatt, B. J. L. Fayle, M. Ffoulkes, A. C. Hancock, R. J. Harley-Mason, F. T. Hill, T. A. Hindmarsh, E.W. N. Hobhouse, *A. N. Hooper, O. R. Horwood, H. F. Hutchinson, T. H. James, G. B. Jameson, F. E. Johnson, R. B. Johnson, C. Kingston, J. I F. Knight, N. C. Lake, J. L. Lauder, J. L. D. Lewis, C. C. Ling, W. H. Lister, G. T. Loughborough, O. G. Magianess, D. Maham, G. N. Martin, E. E. Mather, H. Mather, J. Millard, G. H. Monrad-Krohn, J. Y. Moore, W. Morris, J. T. Morrison, *Margaret C. Murphy, M. B. O'Sullivan, H. B. Owens, H. W. Parnis, W. P. Penhale, V. C. Pennell, J. A. Perera, A. S. Plant, J. Precopoulos, E. Rayner, †S. J. S. Reid, †E. Ritson, C. S. L. Roberts, W. E. R. Saunders, A. E. Schokman, L. E. S. Sharp, G. D. Sherwood, *J. V. Shirgaokar, A. C. S. Smith, A. J. E. Smith, H. J. D. Smythe, A. K. Soutar, T. S. Stafford, W. A. Stewart, J. W. Stretton, W. V. T. Styles, W. E. Tanner, J. W. Thomas, J. A. Tsoi-A-Sue, F. C. Turnbull, C. B. Vakil, W. H. von Wyss, J. G. Wardrop, C. W. Wheeler-Bennett, C. E. Williams, H. A. Williams, F. E. S. Willis, C. W. Wilson, H. G. Wiltshire, H. G. Winter.

* M.R.C.S. diploma granted October 9th, 1913.
† Under the Medical Act, 1876.

Public Health

SCHOOL MEDICAL SERVICE GROUP OF THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE first meeting of the School Medical Service Group of the Society of Medical Officers of Health was held at the society's offices, on November 7th, under the chairmanship of Dr. Alfred Greenwood.

Dr. Robert Hughes (Stoke-on-Trent) was elected Chairman; Dr. Armly Ashkenny, Honorary Secretary; and Dr. C. W. Hutt, Honorary Treasurer. The Committee of the Group consists of the above three *ex officio* members, together with one member from each of the ten branches of the Society of Medical Officers of Health.

It was decided that all medical officers engaged in the school medical service be invited to join the group, and that the assistants in the service should have special consideration, for, as pointed out by Dr. Bostock Hill, the School Medical Officer and Medical Officer of Health for Warwickshire, the primary object of the group is to remedy the admitted discontent existing among them, rather than among the senior or administrative medical officers, who already have their own groups.

Subjects urgently pressing for remedies were fully discussed. The present low salaries of assistants were condemned as very inadequate considering the long, expensive, and arduous professional training, often lasting for ten years, and the responsible, onerous, and the rapidly increasing duties to be performed. The Board of Education has admitted the gross inadequacy of salaries of medical officers in its circular letter to local authorities dated August 18th. Even with the promise of increased grants by the Board for medical inspection, local education authorities are not likely to increase the salaries of the medical staff to any considerable extent, as desired by the Board, unless all assistant medical officers combine in one body and unitedly claim juster treatment from local authorities.

Among other subjects discussed were the status and grading of assistants, the necessity of extending the duties to include general public health work, and the encouragement of discussions on subjects of educational and social interest.

It was decided that the next meeting of the group be held on Saturday, December 6th, at 2.0 p.m., at 1, Upper Montague Street, Russell Square, London, W.C.

As no recent complete list of assistants in the School Medical Service exists, assistants are requested to send their name and address, and anything that may be of interest to the service, to Dr. Armly Ashkenny, Honorary Secretary, Medical Department, Education Office, Council House, Birmingham.

DEATH CERTIFICATION.

F. H. G. writes: How far is a registrar of births and deaths justified in refusing to accept a death certificate signed by a registered practitioner? May I be allowed to give a brief summary of a case? My partner was called out to see a child in convulsions. After a few hours the child died. Since the primary cause of the convulsions could not be determined, it was certified that the child died of "convulsions, cause unknown." This certificate the registrar declined to accept, and the matter was reported by him to the coroner. It was represented to the mother of the child that all this annoyance might have been spared to her had her medical man given a proper certificate. In other words, in the registrar's opinion the certificate was wrong and valueless, because the medical man stated in it the cause of death "to the best of his knowledge and belief." I should like to know if the registrar has any authority in treating the certificate in the way he did, for, apart from the annoyance caused to the relatives of the deceased person, such a procedure on the part of the official is apt to put the medical attendant in an awkward, and, at times, in a not very enviable position.

*** The certificate given by our correspondent's partner was the proper one for him to give in the circumstances. It stated the cause of death so far as the cause was known to the practitioner, and very properly indicated the limit of his knowledge. If the registrar is correctly reported to have used any expression to the effect that the certificate was not proper, he exceeded his duty. On the other hand, the regulations of the Registrar-General did not authorize him to regard it as a full and sufficient statement of the primary cause of death, because "convulsions" is not a disease, but a symptom or condition common to many different diseases and injuries. The certificate on the face of it stated that the cause of the convulsions in this case was "unknown." We think, therefore, that the registrar was justified in regarding the primary cause of death as unknown, in which case he was bound to refer the certificate to the coroner. He is expressly ordered by the Registrar-General to do so. This in itself implies no slight on the medical attendant, nor does it imply that the certificate is "wrong." It merely implies that the information given by the certificate is not sufficient to entitle the registrar to deal with the matter, and to issue an order for burial without the permission of the coroner. This our correspondent will no doubt agree with us in regarding as a very valuable check upon the registrar's exercise of a very responsible function.

RESIGNATION OF POOR-LAW APPOINTMENT.

SIMPLEX.—A month's notice is necessary before resigning a Poor-Law appointment, and it may be given at any time. It is, however, better, where possible, to give the notice so that its expiration coincides with the date when a monthly, or quarterly, payment of salary is due.

Medical News.

THE KING, on the recommendation of the Home Secretary, has appointed Mr. W. H. Dickinson, M.P., and Mrs. Pinsent to be Commissioners (unpaid) under the Mental Deficiency Act, 1913.

THE number of students entering the medical school at Cambridge this year is 116; in 1911 the number was 114, and in 1912 it was 110.

THE annual dinner of the Royal Free Hospital and School of Medicine for Women will be held at the Trocadero, Piccadilly Circus on Wednesday, December 10th. Dr. J. Walter Carr will take the chair at 7.15 p.m.

DR. J. SHIRLEY STEELE PERKINS has been elected Sheriff of Exeter, a post held by his grandfather, Dr. Samuel Steele Perkins, in 1858, and by his father, Dr. Alfred Steele Perkins, in 1880.

THE Guy Medal in silver of the Royal Statistical Society has been presented to Dr. Reginald Dudfield, M.O.H. Paddington, in recognition of his essay on stillbirths in relation to infantile mortality and the special work done by him in the interests of the society.

AT a meeting of medical men resident in Cambridge and Huntingdonshire, held on November 18th under the presidency of Sir T. Clifford Allbutt, a resolution was carried expressing their concern at the possibility of no public inquiry being held into the rights which followed the death of Dr. Dimock of Wisbech, Cambridgeshire.

AT the meeting of the Medico-Legal Society, at the house of the Medical Society of London, Chandos Street, W., on Tuesday next, at 8.30 p.m., Dr. Robert Jones will read a paper on the urgent necessity for the treatment of early or threatening insanity, and the need for immediate legislation.

AT the next meeting of the Hunterian Society, to be held on Wednesday next, November 26th, at 9 p.m., in the Library of St, Bartholomew's Hospital, there will be a discussion on migraine. It will be opened by Dr. Andrew Currie and continued by Mr. Sydney Stephenson, Dr. Frederick Taylor, Mr. Charles Wray, and Mr. Arthur Evershed.

WE learn from the treasurer of Epsom College that out of eleven boys who entered for the first examination for medical degrees at the University of London in July last, ten passed in all subjects. The eleventh boy failed in chemistry only. One of the boys gained distinction for chemistry and physics, and another won an open scholarship of £75 at St. Mary's Hospital. Open scholarships, both in arts and science, have been gained this autumn at St. Bartholomew's Hospital by former pupils of Epsom College.

Two instances of Caesarean section performed by the patient on herself without fatal results have recently been published. In one recorded by Guggenberg, a woman in labour had a fit, and thought that she was bound to die. She had heard about Caesarean section and desired to save her child. She managed to hit off the uterine cavity, but found some difficulty in extracting the fetus by one foot. The head was easily delivered. She divided the cord, although the child was dead, and extracted the placenta. A few hours later surgical assistance was sought, and after the reduction of prolapsed intestine the uterine and parietal wounds were sutured. Within six weeks the patient, a woman, aged 37, was at work again. The other case was reported recently by Patek (*Zentralbl. f. Gynäk*, July 26th, page 1105) to the Medical Society of Vienna. A country girl, aged 19, became pregnant, and one day when she believed that term had arrived, though no pains had been felt, she sat down with a big bucket of water in front of her, and cut clean into her uterus through the parietes, using her father's razor. She fainted at the escape of blood, and according to her statement did not observe how the child was delivered. The child, which had breathed, was afterwards found with the placenta in the bucket, in which it had clearly been drowned. The patient was unconscious when admitted into a hospital in Vienna. The incision, over 6 in. long, had been made in the middle line, and intestine protruded freely. Bick, the operator, found bloody serum in the peritoneum, and this induced him to explore the viscera. He was not aware that at the time that there had been pregnancy. He discovered a puerperal uterus, well-contracted and nearly empty; he sewed up the wound in it, after clearing out a few fragments of placenta and membrane. There was no reaction to speak of, save a rise of temperature associated with suppuration in the parietal wound. The patient married after convalescence and became pregnant once more. Patek administered ergot and pituitary extract, and a live male child was delivered without instrumental aid. There was an incisional hernia, but after careful bandaging during the puerperium it diminished, and the patient was soon able to return to her household duties.

In presenting to the Municipal Council a report by Dr. Pratt Johnson, Acting Assistant M.O.H. for Johannesburg, on the circumstances of milk production in and around Johannesburg, the M.O.H. (Dr. Porter) states that the situation and condition of many of the existing cowsheds, and, in many instances, the personnel of the licensees, have combined to create a state of affairs in regard to the milk supply which is the reverse of satisfactory. The average daily milk supply of Johannesburg is estimated at 8,200 gallons; of this, 19 per cent. is sent by rail and 7.5 per cent. by road; the remainder is produced within the municipal area. A large number of the dairies are situated in congested residential districts. The result of Dr. Johnson's inspection of dairies is by no means satisfactory. Of 270 cowsheds licensed only 2 are classed as "very good," 16 are "good," 166 as "fair," while 67 are "bad," and 19 are "very bad." It is noted that a material proportion of the milk production of Johannesburg is in the hands of low-class Eastern Europeans, who have absolutely no idea of the meaning of the word "cleanliness"—as applied to milk production. Some 4,000 cows are stalled within the municipality; of these 2,000 are in congested districts. Dr. Johnson remarks that if the cattle were entirely stall-fed, any nuisance occasioned would be confined to the actual dairy premises, but in practically all cases the cattle are driven twice daily from the cowsheds, through the streets of the town, to grazing grounds, and the streets and footpaths are fouled. Some pertinent remarks are made by Dr. Johnson in his report with reference to the structure of cowsheds, manure disposal, water supply, and the cleanliness of utensils and milk bottles. The habits, clothing, and health of the "milk boy" or "dairymaid" are, it is said, not always satisfactory. As the result of Dr. Johnson's report it is recommended that the already existing by-laws relating to dairies and milkshops be revised and extended. They should provide for licensing and regulating purveyors of milk, dairies, milk shops, and every cowshed in which one or more milch cows are kept. It should prescribe the conditions under which milk may be stored, sold, or used within the municipality, and should prohibit the sale of tuberculous milk, and provide for veterinary inspection of milch cows. Finally it is advised that a thorough inspection of dairies and milk should be instituted and dairy inspectors appointed for this purpose.

Letters, Notes, and Answers.

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CORRESPONDENTS not answered are requested to look at the Notices to Correspondents of the following week.

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☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

LETTERS, NOTES, ETC.

A Warning.

MESSRS. J. AND A. CHURCHILL request us to state that a warrant has been issued for the arrest of a man who professes to be travelling in books for that firm. Messrs. Churchill add that he uses the name of Williams and also of Longford, but has never been employed by them.

Rex v. Hamilton.

DR. W. H. GIMBLETT (86, Sutherland Avenue, Maida Vale, W.), whose appeal giving the names of the committee formed to raise a fund to reimburse Dr. Hamilton was published on October 25th, p. 1118, acknowledges the following subscription, in addition to the sum of £61 1s. 6d. already acknowledged: Dr. J. Thoresby Jones (London), 10s. 6d.

Scrapie.

DR. J. DUNBAR-BRUNTON (Heliopolis, Egypt) writes: I have read with interest your description in the JOURNAL of November 1st of the symptoms of the sheep disease, "scrapie." It seems to be that by examination of the blood or spinal fluid the causation of the disease might be found to be due to trypanosomiasis. The fact that it is suspected of being produced by coitus indicates a strong resemblance to the disease known as *mal de caderas*, which affects horses, and is due to trypanosomes.

Emetine.

DR. WILLIAM HARDMAN (Blackpool), struck by the anomaly of applying the term "emetine" to the principal alkaloid in ipecacuanha, though it does not produce vomiting, suggests that it should be changed; he proposes the term "ipecine" as a substitute.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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